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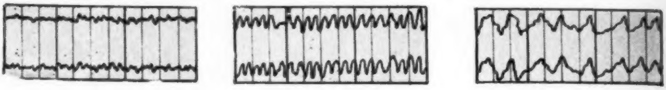

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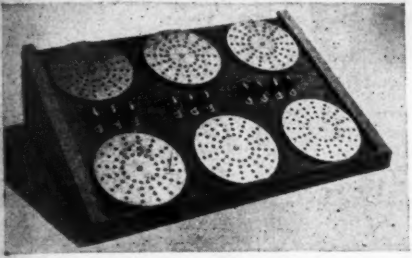

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EDITORIAL

# DEMONSTRATION

## PART 3

THE toughest part of the problem of the meaning of "demonstration" is the fact that it is a highly emotional problem—and solving it will inevitably involve a great deal of acutely painful emotional consequences for almost every living individual.

Since "demonstration" is normally assumed to imply an objective, impersonal system of events, applying to an objective reality, the statement that it is an emotional problem may seem inappropriate. Unfortunately, it is decidedly relevant. If a demonstration is to be an unarguable, unequivocal, certain presentation of a truth that is *true,* and which *must* be accepted as true . . . it means in effect a statement that compels belief and acceptance, willy-nilly, like-it-or-not, and no matter how violently it shatters a man's whole world-structure. This is not an unemotional consequence.

When Semmelweiss presented the evidence that childbirth fever was caused by something on the hands of the examining doctors, and could be prevented by washing their hands, the evidence was rejected violently. When Semmelweiss eventually wound up in an insane asylum—partly because of the violent campaign of vilification that had been directed against him by outraged doctors—the fact was gladly shouted as proving that the idea was, obviously, the idea of a madman.

The reason is understandable enough. If a man had given forty years of his life to obstetrics, sincerely devoting his energies to being a true healer, sorrowing at each young mother's death . . . what would be the emotional reaction in him to the demonstrated (i.e., unarguable and inescapable) evidence that he had killed them with his own unclean hands?

What were the emotional reactions of the world's foremost experts on phlogiston—men with a lifetime devoted to research, respected and accepted as leaders in the field of chemistry—when Lavoisier came along?

Certainly scientists *should* not allow emotional reactions to interfere with the clean, straight honesty of objective thinking. We are in agreement as to what *should* be. Is there, however, any possibility of honest objective observation of Mankind that would not list emotional response to such belief-pattern destroying ideas as a human characteristic? And do we, as yet, have any nonhuman scientists? Computers may be logicians, but scientists run them.

The fact is that no one knows anything whatever *for certain*. But we have to act as though we did! Objective data isn't useful as such; it's necessarily and inherently—always and invariably—a set of unique, unrelated, and uncorrelatable data. Correlation, remember, is *not* data, but *theory*. I can observe a reading on a meter. I can observe that the meter is connected to Unit A. The two observations have no objective-observation correlation; the connection might be simply that the meter casts a shadow on A. The connection may *look* like wires, but be simply plastic tubes. The meter may be labeled "DC VOLTS," but that doesn't prove it's accurate.

Further, a DC meter will say no volts and no amperes, while an AC current is flowing to and operating an electric furnace. Again, in a resonant circuit, a correctly designed set of meters may read one hundred amperes and one thousand volts . . . but there's no power, because voltage and current are out of phase. Data, *without correlation*, is completely meaningless.

Data with a wrong correlation has meaning all right . . . but a wrong meaning. A DC meter may assure you there's no voltage on this line—but there are two thousand volts AC present, and you're a dead man if you touch it.

"To demonstrate" then is not, never was, and never will be *a purely objective operation*. It inherently involves a nonobjective operation, correlation. Correlation is not a single-valued function; a mouse correlates with the concept "mammal," but also correlates with the concept "mass." Which is *the* correct correlation? If I demonstrate conclusively that a mouse is mass, does that prove that it is not a mammal? If I demonstrate that this yellow powder *is* sulfur, that establishes beyond question that it is not arsenic sulfide though, doesn't it?

Men know very deeply, very solidly, and very emotionally that differences of opinion are necessary and right in the world. The fact is that there is need for recognition that an infinite number of different opinions concerning the same configuration of data is possible . . . and yet not *all* opinions are possible. In simple logic, the simplest possible case of this type is dealt with; that where one, and only one opinion is valid, and all others are invalid.

But consider an object such as a suspension bridge. There is an infinite set of viewpoints from which the bridge may be observed. Objective photographic evidence of the validity of each of the infinite number of views on the matter can be produced, at least theoretically, though the consumption of film would be somewhat uneconomic. But although an infinite number of views —opinions—are valid, *not all imaginable* views are. A view that shows it has two suspension spans, and three towers, for instance, can not be valid for this bridge; it must be a view of a different bridge.

"To Demonstrate," then, is not a purely objective phenomenon—and it can't be handled by simple cause-effect, single-relationship logic. Further, it infringes on the emotionally intense area of belief-understanding. What you "understand" is, whether it be consciously so acknowledged or not, a system of unsupported beliefs —unsuported, that is, by anything but objective data interlaced with hypotheses and convictions properly called "postulates" or "axioms" which are "self-evident truths needing no proof." Since objective data has no inherent meaning, that reduces to a structure of hypotheses. Sort of like a mixture of sand, gravel, and asphalt; it is quite hard, stable, and strong. Dissolve out the asphalt, however, and the sand and gravel, which actually are hard and strong, fall apart separately—like hard facts in a theory, when the theory dissolves away in the light of new evidence. It suddenly turns out that the hard facts weren't rigidly interrelated at all; the same hard facts now support a totally different theory . . .

One result of this is that human beings will emotionally resist the dissolution of their world-picture—and they'll do this with all the power of sincere men fighting for what they believe in. The scientist is first a human being; he'll fight for his world-picture, whether he realizes that's what he's doing or not. The more emotional content inherent in his science, the greater the tendency will be. Thus the humanic sciences are hardest to work with; medicine comes halfway between the humanic and the physical sciences, and the physical sciences have the least—but still very great—resistance. What happens to a hunk of rock, after all, has less emotional meaning than what happens to a man; geology is freer to change its world-picture than is medical science. Medicine in turn is freer than psychology or religion.

When men are very sure that an innovator is wrong, his demonstrations will be rejected not because of any objective failure of the data . . . but because people *know* that evidence *can't* be right. It must be a swindle, a fraud, a hoax, because it is "obvious" that what the evidence purports to demonstrate is positively known to be impossible. Even if the exact mechanism of the hoax can't be found, the hoax *has* to be there.

Sincere, learned men knew positively that Galileo was wrong; he had to be wrong, and his "demonstrations" had to be tricks. Even though they couldn't figure out how that clever illusion of the telescope was worked, they *knew* Jupiter didn't have four moons going around in orbits. Only uneducated innocents would fall for such preposterous nonsense. Knowing that it was impossible, it was merely a matter of finding out how the stupid and harmful trick was being worked.

Alexander Graham Bell was very nearly arrested as a stock-swindler, for trying to sell Bell Telephone Company stock. Educated men *knew* it was impossible, and it was their duty to society to see that that fraud didn't mulct gullible innocents.

It's not necessary to know *how* an illusion is being produced to know it *is* an illusion, when it flatly violates the known laws of Nature.

The trouble is . . . the most honest and sincere men, for the most honest and sincere reasons, will "know" the Laws of Nature make something impossible . . . when Nature doesn't happen to know it. It was proven mathematically that a bumble bee couldn't fly. (The proof was perfectly valid; a bumble bee can't fly . . . as a static-wing system. Neither can a helicopter, as any aerodynamicist can readily prove to you mathematically.) Usually, after the "known to be impossible" violation of the known laws of Nature is accepted, it turns out that the laws were right enough . . . but were misapplied.

As many readers know, I'm much interested in psionics. In my time, I've been interested in rocket engines, nuclear physics, and a number of other crackpot ideas. One of the reasons I'm interested in psionics is that it is an excellent opportunity to study the problem of "What constitutes demonstration?" — and that, my friends, is *not* just a problem of psionics.

How can a parent demonstrate that the wisdom gained by thirty years of experience isn't "just stuffy old ideas"? The younger generation will learn—but it might save a lot of time and hurt if it didn't require personal experience.

How can any individual who has stumbled on a new idea, or experienced a rare and immensely revealing phenomenon, communicate it to others?

Some years ago I happened to observe that relatively rare phenomenon "ball-lightning." The phenomenon has been reported for centuries; as of 1940 physicists explained that it was a superstition, and had never been reported by any competent, trained observers. That it was simply an after-image in the retina of the eye, caused by the brilliance of the "preceding," and actually quite ordinary lightning flash.

This was, as a matter of fact, exceedingly annoying to me, personal-

(*Continued on page* 157)

# BASIC RIGHT

***It's a basic right to try anything you want—a right the Universe itself grants. But it's necessary to distinguish between the right to try—which is real—and the right to succeed at it—which doesn't exist!***

THEY came out of the starfield under the Earth, from the region of a brilliant sun called Sigma Octantis. Ten huge copper-colored ships. Nobody saw them land. They were astute enough to sit a while in the howling wastes of Antarctica, scout around and seize all twenty members of the International South Polar Expedition.

Even then the world did not take alarm. The newcomers, who titled themselves Raidans, hazarded a guess that within a fortnight Earth would

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### ERIC FRANK RUSSELL

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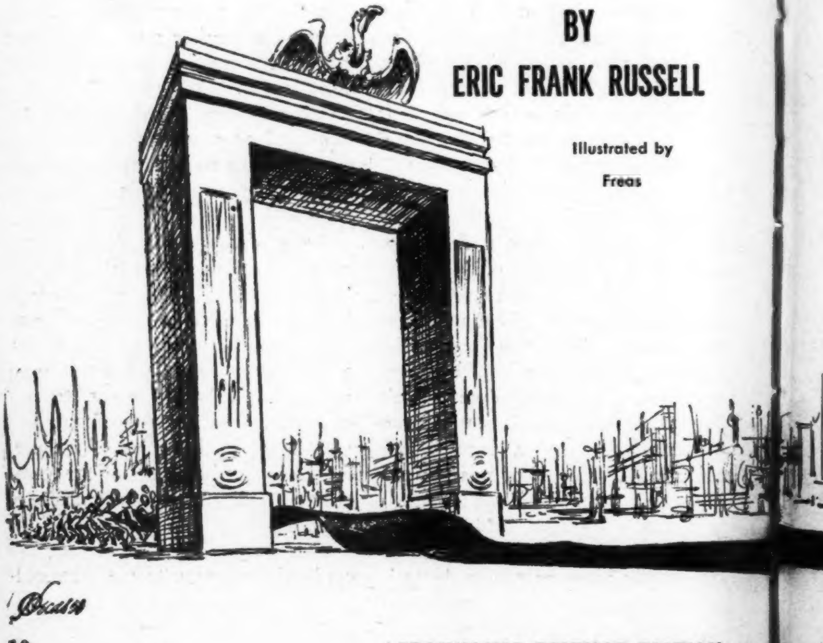
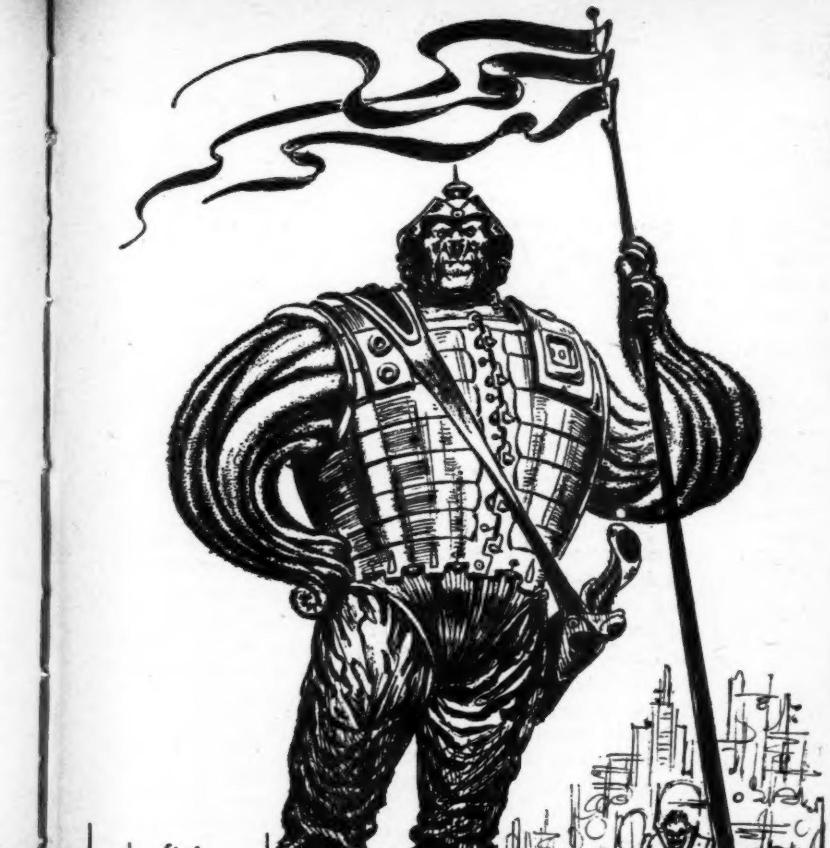




become curious about the fate of the captured. But it didn't work out like that at all; contrary to expectations the Terran prisoners proved *so* submissive and co-operative.

By signs and gestures the Raidans conveyed their cover-up order: "Send out reassuring messages."

The captives did it willingly, in straightforward manner, playing no tricks, well-nigh falling over themselves in eagerness to please. Routine signals from the polar expedition continued to be picked up by listening-posts in Australia, New Zealand and Chile. Nobody found reason to suspect that anything out of the ordinary had occurred down there within the ice barrier where blizzards raged throughout the long-drawn night.

Within the next eleven weeks the invaders learned the Terran language, devoting all their time to picking it up as fast and fluently as possible. This chore could have been avoided by insisting that the prisoners learn to speak Raidan but the tactic would have involved loss of conversational privacy. The Raidans preferred to do the work and keep their talk strictly to themselves.

In the twelfth week Zalumar, commander of the fleet, summoned Lakin, his personal aide. "Lakin, there is no need for us to waste any more hours upon this animal gabble. We can now speak it well enough to make ourselves properly understood. It is time to get out of this frozen place and assert ourselves in conditions of comfort."

"Yes, sire," agreed Lakin, heartened by the thought of coming sunshine and warmth.

"The leader of these prisoners is named Gordon Fox. I wish to speak with him. Bring him to me."

"Yes, sire." Lakin hastened out, returned shortly with the captive.

He was a tall, lean Terran, lank-haired, his face adorned with a polar beard. His gray eyes examined Zalumar, noting the broad shoulders, the long, boneless arms, the yellow eyes, the curious green fuzz overlying the skin. Zalumar found himself enjoying this inspection because it was made with a curious mixture of servility and admiration.

"I have something to say to you, Fox."

"Yes, sire?"

"Doubtless you've been wondering why we are here, what our intentions are, what is going to happen in the near future, eh?" Without waiting for a reply, he went on, "The answer is brief and to the point: we are going to take over your world."

He watched the other's face, seeking fear, shock, anger, any of the emotions normally to be expected. But he detected none of them. On the contrary, Fox seemed gratified by the prospect. There was no rage, no defiance, nothing but amiable complacency. Maybe the fellow had failed to grasp precisely what was meant.

"We are going to assume ownership of Terra lock, stock and barrel," emphasized Zalumar, still watching him. "We are going to confiscate your world because the rewards of life belong to the most deserving. That is our opinion. We have the power to make it the only acceptable opinion. Do you understand me, Fox?"

"Yes, sire."

"The prospect does not annoy you?"

"No, sire."

"Why doesn't it?"

Fox shrugged philosophically. "Either you are cleverer than us or you aren't, one way or the other, and that is that. If you aren't, you won't be able to conquer this world no matter what you say or do."

"But if we are cleverer?"

"I guess we'll benefit from your rule. You can't govern us without teaching us things worth learning."

"This," declared Zalumar, with a touch of wonder, "is the first time in our history that we've encountered so reasonable an attitude. I hope all the other Terrans are like you. If so, this will prove the easiest conquest to date."

"They won't give you any bother," Fox assured.

"You must belong to an amazingly placid species," Zalumar offered.

"We have our own peculiar ways of looking at things, of doing things."

"They appear to be vastly different from everyone else's ways, so different as to seem almost contrary to nature." Zalumar put on a thin smile. "However, it is a matter of no importance. Very soon your people will look at everything in *our* way, do everything in *our* way. Alternatively, they will cease to exist."

"They're in no hurry to die," said Fox.

"Well, they're normal enough in that respect. I had you brought here to inform you of what we intend to do and, more importantly, to show you why your people had better let us do it without argument or opposition. I shall use you and your fellow captives as liaison officers, therefore it is necessary to convince you that your world's choice lies between unquestioning obedience or complete extermination. After that, it will be your duty to persuade Terran authorities to do exactly as we tell them. Lakin will take you to the projection room and show you some very interesting pictures."

"Pictures?"

"Yes, three-dimensional ones in full color. They will demonstrate what happened to Planet K14 whose people were stupid enough to think they could defy us and get away with it. We made an example of them, an object lesson to others. What we did to their world we can do to any planet including this one." He gave a careless wave of his hand. "Take him away and show him, Lakin."

After they'd gone he lay back in his seat and felt satisfied. Once again it was about to be demonstrated that lesser life-forms are handicapped by questions of ethics, of morals, of right and wrong. They just hadn't the brains to understand that greed, brutality and ruthlessness are nothing more than terms of abuse for efficiency.

Only the Raidans, it seemed, had the wisdom to learn and apply Nature's law that victory belongs to the sharp in tooth and swift in claw.

In the projection room Lakin turned a couple of switches, made a few minor adjustments to controls. Nearby a large grayish sphere bloomed to life. At its middle floated a tiny bead of intense light; near its inner surface swam a smaller, darker bead with one face silvered by the center illumination.

"Now watch!"

They studied the sphere. After a short while the dark outermost bead suddenly swelled and blazed into fire, almost but not quite rivaling the center one with the intensity of its light. Lakin reversed the switches. The two glowing beads disappeared, the big sphere resumed its dull grayness.

"That," said Lakin, having the grace not to smack his lips, "is the actual record of the expulsion from the stage of life of two thousand million fools. The cosmos will never miss them. They were born, they served their ordained purpose and they departed—for ever. Would you like to know what that purpose was?"

"If you please," said Fox, very politely.

"They were created so that their wholesale slaughter might knock some sense into their sector of the cosmos."

"And did it?"

"Beyond all doubt." Lakin let go a cold laugh. "On every planet in the vicinity the inhabitants fought each other for the privilege of kissing our feet." He let his yellow eyes linger speculatively upon the other. "We don't expect you to believe all this, not right now."

"Don't you?"

"Of course not. Anyone can fake a stereoscopic record of cosmic disaster. You'd be gullible indeed if you let us confiscate your world on the strength of nothing better than a three-dimensional picture, wouldn't you?"

"Credulity has nothing to do with it," assured Fox. "You want to take us over. We're glad to be taken over. That's all there is to it."

"Look, we can back up our pictures with proof. We can show your own astronomers upon their own star maps exactly where a minor sun has become a binary. We can name and prove the date on which this change took place. If that doesn't satisfy them, we can convert to a ball of flaming gas any petty satellite within this system that they care to choose. We can show them what happens and demonstrate that we made it happen." He stared at Fox, his expression slightly baffled. "Do you really mean to say that such proof will not be required?"

"I don't think so. The great majority will accept your claims without argument. A few skeptics may quibble but they can be ignored."

Lakin frowned in evident dissatisfaction. "I don't understand this. One would almost think your kind was eager to be conquered. It is not a normal reaction."

"Normal by whose standards?" asked Fox. "We are aliens, aren't we? You must expect us to have alien mentalities, alien ways of looking at things."

"I need no lecture from you about alien mentalities," snapped Lakin, becoming irritated. "We Raidans have handled a large enough variety of them. We've mastered more life-forms than your kind can imagine. And I still say that your attitude is not normal. If Terra reacts in the way you seem to think it will, without proof, without being given good reason to fear, then everyone here must be a natural-born slave."

"What's wrong with that?" Fox countered. "If Nature in her wisdom has designed your kind to be the master race, why shouldn't she have created my kind as slaves?"

"I don't like the way you gloat about your slavery," shouted Lakin. "If Terrans think they can outwit us, they've another think coming. Do you understand?"

"Most certainly I understand," confirmed Fox, as soothingly as possible.

"Then return to your comrades and tell them what you have seen, what you've been told. If any of them wish for further evidence, bring them here immediately. I will answer their questions, provide any proof for which they may ask."

"Very well."

Sitting on the edge of the table, Lakin watched the other go out. He remained seated for ten tedious minutes. Then he fidgeted for five more, finally mooched several times around the room. Eventually Fox looked in.

"They are all willing to take my word for it."

"Nobody desires to learn more?" Lakin showed his incredulity.

"No."

"They accept everything without question?"

"Yes," said Fox. "I told you they probably would, didn't I?"

Lakin did not deign to answer that one. He made a curt gesture of dismissal, closed the projection room, went back to the main cabin. Zalumar was still there, talking to Heisham who was the fleet's chief engineer.

Breaking off the conversation, Zalumar said to Lakin, "What happened? Did the bearded low-life get the usual fit of hysterics?"

"No, sire. On the contrary, he appears to enjoy the prospect of his world being mastered."

"I am not at all surprised," commented Zalumar. "These Terrans are philosophical to the point of idiocy." His sharp eyes noted the other's face. "Why do you look so sour?"

"I don't like the attitude of these aliens, sire."

"Why not? It makes things easy for us. Or do you prefer to get everything the hard way?"

Lakin said nothing.

"Let us congratulate ourselves upon our good fortune," encouraged Zalumar, oozing oily self-confidence. "Victory without battle comes far cheaper than one paid for in blood. A planet mastered is worth infinitely more than a world destroyed."

Speaking up with sudden resolve, Lakin said, "According to the books we've found here, and according to our own preliminary observations, these Terrans have a civilization only a couple of jumps behind our own. They have short-range spaceships on regular runs to their outer planets. They've even got that small colony we noticed on the system of their nearest star. All that has to be born of and supported by a technology that cannot be the creation of imbeciles."

"I agree," chipped in Heisham, with the enthusiasm of an engineer. "I've been studying the details of their ships. These Terrans are supposed to be about twenty thousand years younger than we—but technically they're nothing like as far behind. Therefore they must—"

"Quiet!" roared Zalumar. He paused to let ensuing silence sink in, then continued in lower tones. "All species are afflicted by what they consider to be virtues. We know that from our own firsthand experience, don't we? The disease of goodness varies as between one life form and another. This happens to be the first world we've discovered on which the prime virtue is obedience. They may have a modicum of brains but they've all been brought up to respect their betters." He threw his listener a sardonic glance. "And you, an experienced space-warrior, permit it to surprise you, allow it to worry you. What is the matter with you, eh?"

"It is only that their submissive attitude runs contrary to my every instinct."

"Naturally, my dear Lakin, naturally. *We* submit to nobody. But surely it is self-evident that Terrans are not Raidans, never have been, never will be."

"Quite right," approved Heisham.

Now under double-fire, Lakin subsided. But deep down within himself he wasn't satisfied. Within this peculiar situation was something sadly and badly out of kilter, his sixth sense told him that.

The move was made next day. Ten ships rose from the barren land bearing with them the twenty members of the I.S.P. Expedition. In due time they landed upon a great spaceport just beyond the environs of a sprawling city which, Fox had assured, was as good a place as any in which to tell the world of the fate that had come upon it from the stars.

Zalumar summoned Fox, said, "I do not go to native leaders. They come to me."

"Yes, sire."

"So you will fetch them. Take all your comrades with you so that if necessary they may confirm your story." He eyed the other, his face hard. "With what we've got we do not need hostages. Any treacherous attack upon us will immediately be answered a hundredfold without regard for age or sex. Do you understand?"

"Yes, sire."

"Then get going. And you won't

take all day about it if you're wise."

He strolled to the rim of the flagship's air lock door and watched the twenty make off across the hot concrete, hurrying toward the city. They were still hairy-faced and wearing full polar kit under the blazing sun. Four clean-shaven Terrans in neat, cool uniforms drove up and braked at the bottom of the ladder. One got out of the car, shaded his eyes as he looked upward at the alien figure framed in the lock.

With total lack of amazement, this newcomer called, "You sent no beam warning of arrival. We've had to divert two ships to another port. Carelessness like that makes accidents. Where are you from?"

"Do you really expect me to know your language and be familiar with your rules and regulations?" asked Zalumar, interestedly.

"Yes, for the reason that you had twenty Terrans with you. They know the law even if you don't. Why didn't you beam a warning?"

"Because," said Zalumar, enjoying himself, "we are above your laws. Henceforth they are abolished so far as we are concerned."

"Is that so?" gave back the other. "Well, you're going to learn different mighty soon."

"On the contrary," retorted Zalumar, "it is you who will learn, we who shall teach." With that he returned to his cabin, smiled to himself, fiddled around with a thick file of papers. Three hours later he was called to the lock door by a crewman. He went there, looked down upon the same uniformed quartette as before.

Their spokesman said, blankly and unemotionally, "I am ordered to apologize to you for questioning your right to land without warning. I am also instructed to inform you that certain persons whom you wish to see are now on their way here."

Acknowledging this with a sniff of disdain, Zalumar went back to his desk. A multijet plane screamed far overhead and he ignored it. Doubtless some of the crew were leaning out the locks and nervily watching lest something long' black and lethal drop upon them from the sky. But he couldn't be bothered himself. He had these Terrans weighed up—they just wouldn't dare. He was dead right, too. They didn't dare. The shrill sound died over the horizon and nothing happened.

Sometime later Fox appeared with two other I.S.P. members named McKenzie and Vitelli. They conducted a bunch of twelve civilians into the cabin. The dozen newcomers lined up against a wall, studied the Raidan commander with frank curiosity but no visible enmity.

Fox explained, "These, sire, are twelve of Terra's elected leaders. There are thirty more scattered around, some in far places. I regret that it is not possible to trace and and bring them here today."

"No matter." Zalumar lay back in his chair and surveyed the dozen with suitable contempt. They did not fidget under his gaze nor show any signs of uneasiness. They merely gazed back steadily, eye for eye, like a group of impassive lizards. It occurred to him that it was well-nigh impossible to discern what they were thinking. Oh, well, the time-honored tactic was to start by kicking them right in the teeth.

"Let's get something straight," harshed Zalumar at the twelve. "So far as we are concerned, you are animals. Lower animals. Cows. *My* cows. When I order you to produce milk you will strain to produce it. When I order you to moo you will promptly moo, all together, in concert with the other thirty who are absent."

Nobody said anything, nobody got hot under the collar, nobody appeared to care a solitary damn.

"If any one of you fails to obey orders or shows lack of alacrity in doing so, he will be jerked out of mundane existence and replaced with a good, trustworthy and melodious mooer."

Silence.

"Any questions?" he invited, feeling a little irritated by their bland acceptance of racial inferiority. A scowl, just a frightened half-concealed scowl from any one of them would have given him much inward pleasure and enabled him to taste the full, fruity flavor of conquest. As it was, they made victory seem appallingly insipid; a triumph that was no triumph at all because there had been nothing to beat down.

They didn't so much as give him the satisfaction of meeting their queries with a few devastating retorts, of crushing them with responses calculated to emphasize their individual and collective stupidity. Still in line against the wall, they posed silently, without questions, and waited for his next order. Looking at them, he got the weird feeling that if he'd suddenly bawled, "Moo!" they'd have all mooed together, at the tops of their voices—and in some mysterious, elusive way the laugh would be on him.

Snatching up the intercom phone, he called Captain Arnikoj and when that worthy arrived, said, "Take these twelve simpletons to the registry on Cruiser Seven. Have them thoroughly recorded from toenails to hair. Extract from them all the details you can get concerning thirty others who have yet to arrive. We shall want to know who the culprit is if one of them fails to turn up."

"As you order, sire," said Arnikoj.

"That's not all," continued Zalumar. "When you've finished I want you to select the least cretinous specimen and return him to this ship. He will be retained here. It will be his duty to summon the others whenever I require them."

"It shall be done, sire."

Zalumar now switched attention back to the twelve. "After you have been registered you may go back to your posts in the city. Your first act will be to declare this spaceport the sole and exclusive property of the Raidan fleet now occupying it. All Terran officials will be removed from the port, none will be allowed to enter except with my permission."

They received that in the same silence as before. He watched them go out, moving dully along one behind the other, following Arnikoj's lead. Great God in Heaven, what witless animals they were!

Zalumar now stared querulously at Fox, McKenzie and Vitelli. "Where are the other seventeen members of your expedition?"

"They remained in the city, sire," explained Fox.

"Remained? Who said they could remain? They are required here, *here!*" He slammed an angry fist upon the desk top. "They have not the slightest right to stay behind without an order to that effect. Who do they think they are? I shall swiftly show them how we deal with those who think they can do as they like. I shall—"

"Sire," chipped in Fox, cutting short the tirade, "they asked if they might stay a short while to clean up and change into more suitable clothing. I told them I felt sure you would approve of them looking more presentable. It didn't seem reasonable to suppose that you might resent their efforts to please you."

A momentary confusion afflicted Zalumar's mind. If a trooper goes AWOL solely to fetch his commanding officer a gold medal, what does the latter do about it? For the first time he sensed a vague touch of the indefinable something that was troubling the uneasy Lakin. All was not quite as it should be. This Fox fellow, for instance, was twisting his arm in front of two witnesses and there was nothing much he could do about it.

Determined to concoct a gripe, he growled, "All right, let us accept that their concern for my pleasure is praiseworthy and therefore excusable. Why have you and these other two not shown the same desire to gratify me? Why have you returned in those shapeless and filthy clothes, your faces still covered with bristles? Are you telling me that seventeen care but three do not?"

"No, sire," said Fox, busily polishing apples that might prove to be scoot-berries. "Someone had to come back. We hoped that when the seventeen return you might graciously permit us to go and get cleaned up in our turn."

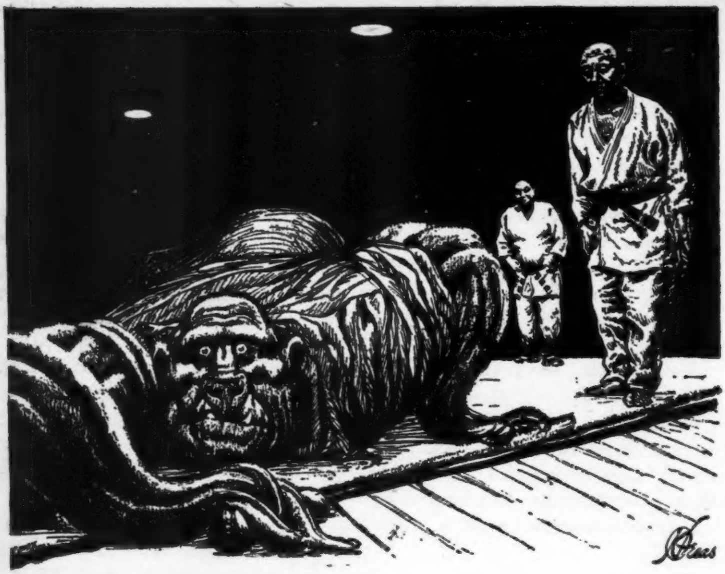
"You had better do that," conceded Zalumar. "We can recognize animals with no trouble at all. Therefore it isn't necessary for you to look like them, smell like them."

He watched the other carefully, seeking a hint of hidden anger such as a slight narrowing of the eyes or a tightening of the jaw muscles. Fat lot of good it did him. Fox's features remained wooden behind his polar mask of hair. McKenzie acted like he was stone-deaf. Vitelli wore the same unctuous smile that never left his moonlike face.

"Get out," he ordered. "Report to Arnikoj. Tell him you have my permission to visit the city after the others have returned. Be back by nightfall."

"And after that, sire?"

"You will remain under Arnikoj's



personal command. I will send for you whenever I want you."

When they had gone he strolled to the nearest port, gazed out at the great city. Slowly and with miserly lovingness he took in its towers, spires, skyways and bridges. Mine, he thought, all mine. A worthy prize for the worthy. The battle to the strong, the spoils to the bold and brave.

Lakin mooched in, said hesitantly, "I have been thinking, sire. We're sort of all bunched up together. Ten ships practically standing side by side. Might it not be better if we spread ourselves a little? Couldn't we keep, say, four ships here and place three each in two other spaceports?"

"Why?"

"We don't yet know what their best weapons are like—but we do know that one well-placed bomb could vaporize the lot of us."

"So could three bombs. So what have we to gain by splitting up?"

"Unless they dropped them simultaneously, the first blow would warn the rest. Some of us could escape and hit back."

"If they can summon up the nerve to drop any at all," said Zalumar, "you can bet your life they'll drop them together. It's all or nothing so far as they're concerned. Probably they would do their best to wipe us out if they thought for one moment that it would do them any good. They know it won't. They know it would bring retaliation from the Raidan Imperial Forces. We would be avenged."

"Not yet we wouldn't," Lakin contradicted. "To date Raidan hasn't the faintest notion of where we are or what we're doing. I have just asked Shaipin whether he has yet beamed our official report. He hasn't. Until he does so, and receives Raidan's acknowledgment, we are just another task force lost in the mist of stars."

Zalumar gave a grim smile. "My dear Worryguts Lakin, only *we* know that we're out of contact. The Terrans *don't* know it. They're not going to take the risk of enticing a full-scale attack that will cremate the lot of them. Like everything else, they have a natural desire to survive. They value their skins, see?"

"I asked Shaipin why he hasn't yet signaled our whereabouts," Lakin persisted. "He said he'd not yet received the order from you. Do you wish me to tell him to beam our report?"

"Certainly not." Turning his back upon him, Zalumar again absorbed the glorious vision of the city.

"Sire, regulations require us to report immediately we have overcome opposition and taken complete command."

Swinging round, Zalumar spat at him, "Do you think I, the commander, am ignorant of regulations? Shaipin will send the necessary signals when I say so, and not before. I am the sole judge of the proper moment."

"Yes, sire," agreed Lakin, taken aback.

"And the proper moment is not yet."

He said it as though it might never come.

Zalumar was quite a prophet.

Shaipin still had not been given the order a month later. Nor three months later, nor six. It never occurred to him to query the omission or, if it did, he preferred to keep his mouth shut. As for Lakin, he had tactfully refrained from mentioning the matter again. To his mind, Zalumar had staked his claim to full responsibility for everything done or not done—and he was welcome to stay stuck with it.

Through the many weeks events had shaped themselves beautifully. The Terrans co-operated one hundred per cent, displaying no visible enthusiasm but functioning with quiet efficiency.

Whenever Zalumar felt like larruping the leadership he ordered the entire snollygoster to parade before him and forty-two of them came on the run. His word was their command, his slightest whim had the status of a law. He did not doubt that if he'd been capable of sinking to such childishness he could have made them worship the ground on which he trod and kiss every footprint he left in the dirt. It was a wonderful exhibition of what can be done when the choice is the simple one of obey or burn.

One result of all this was that he,

Zalumar, had fled the confines of a warship for the first time in more years than he'd care to count. He was no longer encased in metal, like a canned *rashim*. The tactic had been the easiest ever, requiring not even the chore of waving a magic wand. All he'd had to do was ask and it shall be given unto you. No, not ask, *tell*.

"You will confiscate and assign solely to me this world's most imposing palace. Whoever occupies it at present will be thrown out. All necessary repairs will be tended to without delay. The palace will be decorated and refurnished in sumptuous style suitable to my position as Planetary Governor. You will provide a full quota of trained servants. I'll inspect the place immediately everything is ready—and for your own good you'd better make sure that it meets with my approval!"

They made sure all right. Even on Raidan nobody had it half so magnificent or a third as luxurious. He could think of many military contemporaries who'd grind their teeth with envy to see Nordis Zalumar, a mere ten-ship commander, making like a natural-born king. Nay, an emperor.

The palace was enormous. The center portion alone came close to being an international monument in its own right, without considering the vast expanse of east and west wings. Even the servants' quarters were about the size of a large hotel. The grounds around the palace numbered four thousand acres, all carefully landscaped, complete with a lake filled with multi-colored fish and ornamental water-fowl.

It was evident that the place had been prepared with lavishness that had no regard for cost. A world had been looted to gratify the one who could vaporize it from poles to core. Three thousand million animals had combined to pay the heavy premium on a fire-insurance policy.

Zalumar approved; even he could not dig up a lordly quibble. There was only one snag: the palace lay two thousand miles from the spaceport, the city, the seat of world-government. There was only one solution: he ordered a new spaceport built on the fringe of his estate. This was done and his ten-ship fleet moved to the new location.

Next, he commanded the entire world leadership to set up home immediately outside his guarded gates. Nobody moaned, groaned, raised objections or so much as favored him with a disapproving frown. There was a rush of prefabricated buildings to the designated spot, a new township sprang into being complete with a huge web of telephone wires and a powerful radio station.

Meanwhile Zalumar had taken possession of his property. The transfer was made without ceremony; he merely stalked in at the front door as becomes one who literally owns the earth. His first move was to assign apartments in the west wing to his senior officers, inferior ones in the east wing to his twenty-one Terran stooges. This tactic helped populate a great emptiness, provided company, ensured a constant supply of adulation or, at least, dumb agreement.

"Aie!" he sighed with pleasure. "Is this not better than squatting in a hot can and being hammered day after day for the greater glory of others but never of ourselves?"

"Yes, sire," dutifully approved Heisham.

Lakin said nothing.

"We shall now reap the rewards of our virtues," continued Zalumar. "We shall live the life of . . . of—" He felt around in his jacket, produced a small pocket book and consulted it. "A character named Reilly."

"I have heard him mentioned by the Terrans," said Heisham. "And I imagine this is just the sort of place he'd have." He let admiring eyes survey the room, finished, "I wonder who did own it and what has happened to him."

"We can soon learn," Zalumar answered. "A Terran has just crossed the hall. Go get him and bring him here."

Heishman hastened out, came back with Vitelli.

"To whom did this place belong?" demanded Zalumar.

"To nobody." Vitelli favored him with his usual oily smile.

"Nobody?"

"No, sire. Previously this was the world's largest and latest international hospital.'

"And just what is a hospital?"

The smile faded away, Vitelli blinked a couple of times and told him.

Zalumar listened incredulously, said, "An individual who is sick or injured is either capable or incapable of recovering. He can regain his efficiency or he is permanently useless. One thing or the other—there is no third alternative. That is logical, isn't it?"

"I suppose so," responded Vitelli, with reluctannce.

"You don't suppose anything," Zalumar contradicted in louder tones. "You *know* for a fact that it is logical because I have *said* that it is. And say 'sire' when you answer me!"

"Yes, sire."

"If an individual can recover, he should be left to do it as best he can; he has every inducement to succeed, knowing the penalty of failure. If he cannot do it, he should be got rid of in the orthodox way; he should be gassed and cremated. It is sheer waste of time and effort for the fit to coddle the unfit."

He stared hard at Vitelli who offered no remark.

"It is contrary to natural law for the efficient to assist the inefficient who should be left to stew in their own juice. How many defective bodies were being pampered in this . . . uh . . . hospital?"

"About six thousand," informed Vitelli, again forgetting the "sire."

"Where are they now?"

"They were transferred to other hospitals. It has meant a little overcrowding in some places but I guess things will be straightened out in due time."

"So!" Zalumar thought a bit, looked as though about to voice something drastic, changed his mind and said, "You may go." After Vitelli had departed, Zalumar commented to the others, "I could order the prompt destruction of all this defective rubbish. But why should I bother? The chore of tending a horde of mental or physical cripples keeps Terran hands busy. Things remain orderly and peaceful when everyone is fully occupied. It is a world with time on its hands that makes itself a dangerous nuisance."

"Yes, sire," agreed Heisham, admiring him.

"Well, we now know something more," Zalumar went on. "In addition to being cowardly and stupid they are also soft. They are soft and yielding, like this stuff they call putty."

Lakin said in the manner of one meditating aloud, "How far does one get by plunging a sword into a barrel of putty? How much does one really cut, stab or destroy?"

Studying him blank-faced, Zalumar harshed, "Lakin, you will cease annoying me with senseless remarks."

Everything worked smoothly for another two years. In between regal jaunts around his planetary property Zalumar lurked in his palace like a spider in the center of its web. Terra remained utterly and absolutely his to command, ran itself according to his directions. There had been no trouble other than that attributable to ordinary misunderstandings. In nobody's history had anyone sat more securely upon the throne than had the Emperor Nordis Zalumar.

At his command three groups of Raidan officers had gone on a tour of inspection of Terran colonies on Venus, Mars and Callisto. No crude frontiersman would risk cutting their throats; the home-world remained hostage for their safety. They were due back most anytime.

A fourth bunch had gone to look at a small settlement in the Centauri group, Earth's first foothold in another system. They'd not return for quite a piece. None of these groups had sailed in a Raidan warship; they'd all been taken in Terran space liners, traveling in utmost comfort as was proper for a higher form of life.

Of the sixteen hundred Raidans composing the original task force less than two hundred continued on military duty. A hundred formed the permanent palace guard. Eighty kept watch on the ships. All the rest were touring Terra, going where they pleased, at no cost whatsoever. Every man a prince and Zalumar the king of kings.

Yes, every man a prince—that was no exaggeration. If any one of them saw something he fancied behind a shop window he walked inside, demanded it and it was handed over. An expensive camera, a diamond pendant, a racing motor-bike, a streamlined Moon-boat, one had only to ask to be given.

Thus two junior navigators owned

a subtropic island on which stood a magnificent mansion. They'd seen it from a confiscated amphibian, landed, marched in and said to the owners, "Get out." They'd said to the servants, "You stay." So the owners had gone posthaste and the servants had remained. Similarly, twenty grease monkeys were touring the world on a two thousand tons luxury yacht, having ambled aboard, ordered all passengers ashore and commanded the crew to raise anchor.

It seemed impossible that in such circumstances any Raidan could be discontented. Yet here again was that whining nuisance Lakin with a further batch of moans and groans. Some folk evidently would gripe even if given the cosmos on a platter.

"It can't go on forever," opined Lakin.

"It isn't intended to," Zalumar gave back. "We aren't immortal and more's the pity. But so long as it lasts our lifetimes we have every reason to be satisfied."

"Our lifetimes?" Lakin's expression showed that a deep suspicion had been confirmed. "Do you mean that Raidan is to be left in ignorance of this conquest and that contact with our home forces is never to be made?"

Zalumar settled himself deeper in his chair which resembled a cunning compromise between a bed and a throne. He folded hands across an abdomen that was becoming a little more prominent, more paunchy with every passing month.

"My dear witless Lakin, an official report should have been sent more than two and a half years ago. If, like these Terran animals, we had been dumbly obedient and beamed that report where would we be now?"

"I haven't the slightest idea," admitted Lakin.

"Neither have I. But one thing is certain: we would not be *here*. By this time a consolidating expedition would have arrived and off-loaded the usual horde of desk-bound warriors, noncombatant officials, overseers, exploiters, slave drivers, form fillers and all the other parasites who squat all day and guzzle the spoils that space roamers have grabbed for them."

Lakin stayed silent, finding himself unable to contradict an unpleasant truth.

"As for us, we'd be summarily ordered back into our metal cans and told to go find yet another snatch. Right now we'd be somewhere out there in the sparkling dark, hunting around as we've been doing for years, taking risks, suffering continual discomfort, and knowing the nature of our ultimate reward." He pursed his lips and blew through them, making a thin slobbering sound. "The reward, my dead fatheaded Lakin, will be a row of medals that one can neither eat nor spend, a modest pension, a ceremonial mating, a shower of kids, old age, increasing feebleness and, finally, cremation."

"That may be so, sire, but—"

Waving him down, Zalumar continued, "I am of a mind to let the parasites seek their own prey and thus justify their own existence. Meanwhile we'll enjoy the prize we have gained for ourselves. If greed and ruthlessness are virtues in the many, they are equally virtues in the few. Since arriving on Terra I have become exceedingly virtuous and I advise you to do likewise. Remember, my dear bellyaching Lakin, that on our home-world they have an ancient saying." He paused, then quoted it with great relish. "Go thou and paint the long fence, Jayfat, for I am reclining within the hammock."

"Yes, sire, but—"

"And I am very comfortable," concluded Zalumar, hugging his middle.

"According to regulations, not to send a prompt report is treachery, punishable by death. They will gas and burn the lot of us."

"If they find us, *if* they ever find us." Zalumar closed his eyes and smiled sleepily. "With no report, no signal, no clue of any sort, it will take them at least a thousand years. Possibly two thousand. When they rediscover this planet, if ever they do, we shall be gone a long, long time. I am splendidly indifferent about how many officials go purple with fury several centuries after I am dead."

"The men think that a report to Raidan has been postponed for strategic reasons known to the senior officers," Lakin persisted. "If ever they learn the truth, they won't like it."

"Indeed? Why shouldn't they like it? Are they so crammed with patriotic zeal that they prefer to be bounced around on a tail of fire rather than stay here living the life they have earned and deserve?"

"It isn't that, sire."

"Then what is it?"

"A quarter of them are nearing the end of their term of service."

"They have reached it already," Zalumar pointed out. "*All* of us have reached it." He let go the sigh of one whose patience is being tried. "We are in retirement. We are enjoying the Terran pension which is on a scale far more lavish than anything Raidan offers to its conquering heroes."

"That may be—but I fear it won't prove enough."

"What more do they want?"

"Wives and children, homes of their own among their own kind."

"Pfah!"

"We can mate only with our own species," Lakin went on. "Men detained here beyond their term of service are going to be denied that right. It is no satisfactory substitute to have absolute claim on this world's treasures. Anyway, one soon loses appreciation of the value of something gained for nothing, one becomes bored by getting it for the mere asking."

"I don't," assured Zalumar. "I like it, I love it."

"Every day I see windows full of gold watches," said Lakin. "They tire me. I have a gold watch which I obtained by demanding it. I don't want fifty gold watches. I don't even want two of them. So what use are all the others to me?"

"Lakin, are you near the end of your term?"

"No, sire. I have another twelve years to serve."

"Then you are not yet entitled to be mated. As for those who soon may be entitled, that is their worry and not yours."

"It will be *our* worry, sire, if they cause trouble."

Zalumar's yellow eyes flared. "The first mutineers will be slaughtered as a warning to the rest. That is established space-discipline which I, as commander, am entitled to order. Be assured that I shall have no hesitation in ordering it should the need arise."

"Yes, sire, but—"

"But what?"

"I am wondering whether we can afford to take such action."

"Speak plainly, Lakin, and cease to talk in riddles."

"Three years ago," responded Lakin, with a sort of gloomy desperation, "there were sixteen hundred of us. There are less today."

"Go on."

"Forty-two died in that epidemic of influenza to which they had no natural resistance. Eighteen killed themselves joyriding in a commandeered plane. Twenty-three have expired from sheer overeating and indolence. Two vanished while exploring under the seas. This morning three met death by reckless driving in a powerful sports car which the Terrans had built to their order. About forty more have come to their end in forty different ways. We're being thinned down slowly but surely. If this goes on long enough, there'll be none of us left."

"My poor foolish Lakin, if life goes on long enough there will be none of us left no matter where we are, here or on Raidan."

"On Raidan, sire, our passing would not be tantamount to defeat for us and victory for these Terrans."

Zalumar favored him with an ugly grin. "In death there is neither victory nor defeat." He made a gesture of dismissal. "Go thou and paint the long fence . . ."

When the other had departed Zalumar summoned his chief signals officer. "Shaipin, I have just heard that some of our men are getting restless. Do you know anything of this?"

"Somebody is always ready to gripe, sire. Every military force has its minority of malcontents. It is best to ignore them."

"You have six beam-operators per ship, making sixty in all. Are any of these among the grouchers?"

"Not that I am aware of, sire."

"More than two years ago I ordered you to put all the beam-transmitters out of action just sufficiently to prevent them from being repaired and used in secret. Are they still immobilized? Have you checked them lately?"

"I examine them every seventh day, sire. They remain unworkable."

"You swear to that?"

"Yes," said Shaipin, positively.

"Good! Could any one of them be restored in less than seven days?

Could it be made to function in between your regular checks?"

"No, sire. It would take at least a month to repair any one of them."

"All right. I continue to hold you personally responsible for seeing to it that nobody interferes with these transmitters. Anyone caught trying to operate one of them is to be killed on the spot. If you fail in this, you will answer for it with your head." The look he threw the other showed that he meant it. "Is Heisham around or is he vacationing some place?"

"He returned from a tour three or four days ago, sire. Probably he will be in his apartment in the west wing."

"Tell him I want to see him immediately. While you're at it, find Fox and send him here also."

Heisham and Fox arrived together, the former wearing a broad grin, the latter impassive as usual.

Zalumar said to Heisham, "You are in charge of the nominal roll. What is our present strength?"

"Fourteen hundred seventy, sire."

"So we're down one hundred thirty, eh?" observed Zalumar, watching Fox as he said it but getting no visible reaction.

"Yes, sire," agreed Heisham, too well-pleased with himself to be sobered by statistics.

"A self-satisfied smirk is at least a pleasant change from Lakin's miserable features," commented Zalumar. "What has made you so happy?"

"I have been awarded a Black Belt," informed Heisham, swelling with pride.

"You have been awarded it? By whom?"

"By the Terrans, sire."

Zalumar frowned. "There can be no worth-while award on a world where anything may be confiscated."

"A Black Belt means nothing if merely grabbed," explained Heisham. "Its value lies in the fact that it must be won. I got mine at the risk of my neck."

"So we're down one-thirty and you've been trying to make it one-thirty-one. No wonder the men get careless when senior officers set such a bad example. What is this thing you have won?"

"It's like this, sire," said Heisham. "Over a year ago I was telling a bunch of Terrans that we warriors are raised like warriors. We don't play silly games like chess, for instance. Our favorite sport is wrestling. We spend a lot of our childhood learning how to break the other fellow's arm. The natural result is that every Raidan is a first-class wrestler and hence an efficient fighting-machine."

"So—?" prompted Zalumar.

"A medium-sized Terran showed great interest, asked what style of wrestling we used. I offered to show him. Well, when I recovered consciousness—"

"Eh?" ejaculated Zalumar.

"When I recovered consciousness," Heisham persisted, "he was still there, leaning against the wall and looking at me. A lot of witnesses were hanging around, all of them

Terrans, and in the circumstances there was nothing I could do about this fellow except kill him then and there."

"Quite right," approved Zalumar, nodding emphatically.

"So I snatched him in dead earnest and when they'd picked me off the floor again I asked—"

*"Huh?"*

"I asked him to show me how he'd done it. He said it would need a series of lessons. So I made arrangements and took the lessons, every one of them. I passed tests and examinations and persisted until I was perfect." He stopped while he inflated his chest to suitable size. "And now I have won a Black Belt."

Zalumar switched attention to Fox. "Did you have any hand in this matter?"

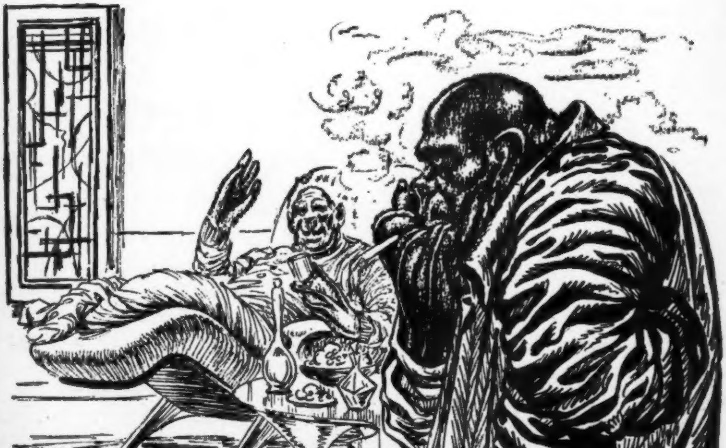
"No, sire."

"It is just as well. Folly is reprehensible enough—I would not tolerate Terran encouragement of it." He turned back to Heisham. "Nobody has anything to teach us. But you, a senior officer, consent to take lessons from the conquered."

"I don't think it matters much, sire," offered Heisham, unabashed.

"Why doesn't it?"

"I learned their technique, mastered it and applied it better than they could themselves. To win my prize I had to overcome twenty of them one after the other. Therefore it can



be said that I have taught them how to play their own game."

"Humph!" Zalumar was slightly mollified but still suspicious. "How do you know that they didn't *let* you throw them?"

"They didn't appear to do so, sire."

"Appearances aren't always what they seem," Zalumar said, dryly. He thought a bit, went on, "How did it happen that the medium-sized Terran mastered you in the first place?"

"I was caught napping by his extraordinary technique. This Terran wrestling is very peculiar."

"In what way?"

Heisham sought around for an easily explainable example, said, "If I were to push you it would be natural for you to oppose my push and to push back. But if you push a Terran he grabs your wrists and pulls the same way. He *helps* you. It is extremely difficult to fight a willing helper. It means that everything you try to do is immediately taken farther than you intended."

"The answer is easy," scoffed Zalumar. "You give up pushing. You pull him instead."

"If you change from pushing to pulling, he promptly switches from pulling to pushing," Heisham answered. "He's still with you, still helping. There's no effective way of controlling it except by adopting the same tactics."

"It sounds crazy to me. However, it is nothing unusual for aliens to have cockeyed ways of doing things. All right, Heisham, you may go away and coddle your hard-won prize. But don't encourage any of the others to follow your bad example. We are losing men too rapidly already."

He waited until Heisham had gone, then fixed attention on Fox.

"Fox, I have known you for quite a time. I have found you consistently obedient, frank and truthful. Therefore you stand as high in my esteem as any mere Terran can."

"Thank you, sire," said Fox, showing gratitude.

"It would be a pity to destroy that esteem and plunge yourself from the heights to the depths. I am relying upon you to give me candid answers to one or two questions. You have nothing to fear and nothing to lose by telling the absolute truth."

"What do you wish to know, sire?"

"Fox, I want you to tell me whether you are waiting, just waiting."

Puzzled, Fox said, "I don't understand."

"I want to know whether you Terrans are playing a waiting game, whether you are biding your time until we die out."

"Oh, no, not at all."

"What prevents you?" Zalumar inquired.

"Two things," Fox told him. "Firstly, we suppose that other and probably stronger Raidan forces will replace you sometime. Obviously they won't leave you here to the end of your days."

*Hah, won't they?* thought Zalumar.

He smiled within himself, said, "Secondly?"

"We're a Raidan colony. That means you're stuck with the full responsibilities of ownership. If anyone else attacks us, you Raidans must fight to keep us—or let go. That suits us quite well. Better the devil we know than the devil we don't."

It was glib and plausible, too glib and plausible. It might be the truth—but only a tiny fragment of it. For some reason he couldn't define Zalumar felt sure he wasn't being told the whole of it. Something vital was being held back. He could not imagine what it might be, neither could he devise an effective method of forcing it into the open. All that he did have was this vague uneasiness. Maybe it was the after-effect of Lakin's persistent morbidity. Damn Lakin, the prophet of gloom.

For lack of any better tactic he changed the subject. "I have an interesting report from one of our experts named Marjamian. He is an anthropologist or a sociologist or something. Anyway, he is a scientist, which means that he'd rather support an hypothesis than agree with an idea. I want your comments on what he has to say."

"It is about we Terrans?"

"Yes. He says your ancient history was murderous and that you came near to exterminating yourselves. In desperation you reached accord on the only item about which everyone could agree. You established permanent peace by mutually recognizing the basic right of every race and nation to live its own life in its own way." He glanced at his listener. "Is that correct?"

"More or less," said Fox, without enthusiasm.

"Later, when you got into free space, you anticipated a need to widen this understanding. So you agreed to recognize the basic right of every *species* to live its own life in its own way." Another glance. "Correct?"

"More or less," repeated Fox, looking bored.

"Finally, we arrived," continued Zalumar. "Our way of life is that of ruthless conquest. That must have put you in a mental and moral dilemma. All the same, you recognized our right even at great cost to yourselves."

"We didn't have much choice about it, considering the alternative," Fox pointed out. "Besides, the cost isn't killing us. We have been keeping a few hundred Raidans in luxury. There are three thousand millions of us. The expense works out at approximately two cents per head per annum."

Zalumar's eyebrows lifted in surprise. "That's one way of looking at it."

"For which price," added Fox, "the planet remains intact and we get protection."

"I see. So you regard the situation as mutually beneficial. We've got what we want and so have you." He yawned to show the interview was over. "Well, it takes all sorts to make a cosmos."

But he did not continue to yawn

after Fox had gone. He sat and stared unseeingly at the ornamental drapes covering the distant door, narrowing his eyes occasionally and striving within his mind to locate an invisible Terran tomahawk that might or might not exist.

He had no real reason to suppose that a very sharp hatchet lay buried some place, waiting to be dug up. There was nothing to go on save a subtle instinct that stirred within him from time to time.

Plus unpleasant tinglings in the scalp.

Another three and a half years, making six in all. Suddenly the hatchet was exhumed.

Zalumar's first warning of the beginning of the end came in the form of a prolonged roar that started somewhere east of the palace and died away as a shrill whine high in the sky. He was abed and in deep sleep when it commenced. The noise jerked him awake, he sat up unsure whether he had dreamed it.

For a short time he remained gazing toward the bedroom's big windows and seeing only the star-spangled sky in between small patches of cloud. Outside there was now complete silence, as though a slumbering world had been shocked by this frantic bellowing in the night.

Then came a brilliant pink flash that lit up the undersides of the clouds. Another, another and another. Seconds later came a series of dull booms. The palace quivered, its windows rattled. Scrambling out of bed he went to the windows, looked out, listened. Still he could see nothing but clearly through the dark came many metallic hammerings and the shouts of distant voices.

Bolting across the room he snatched up his bedside phone, rattled it impatiently while his eyes examined a nearby list of those on duty tonight. Ah, yes, Arnikoj was commander of the palace guard. He gave the phone another shake, cursed underbreath until a voice answered.

"Arnikoj, what's going on? What's happening?"

"I don't know, sire. There seems to be some sort of trouble at the spaceport."

"Find out what's the matter. You have got a line to the port, haven't you?"

"It is dead, sire. We cannot get a reply. I think it has been cut."

"Cut?" He fumed a bit. "Nonsense, man! It may be accidentally broken. Nobody would dare to cut it."

"Cut or broken," said Arnikoj, "it is out of action."

"You have radio communication as well. Call them at once on your transmitter. Have you lost your wits, Arnikoj?"

"We have tried, sire, and are still trying. There is no response."

"Rush an armed patrol there immediately. Send a portable transmitter with them. I must have accurate information without delay."

Dropping the phone, he threw on his clothes as swiftly as possible. A dozen voices yelled in the garden not a hundred yards from his windows. Something let go with a violent hammering. He made a jump for the door but the phone shrilled and called him back.

He grabbed it. "Yes?"

Arnikoj screamed at him, "It is too late, sire. They are already—" A loud *br-r-op-op* interrupted him, his voice changed to a horrid gurgling that receded and slowly ceased.

Zalumar raced out the room and along the outer passage. His mind seemed to be darting forty ways at once. "They," who are "they"? Another Raidan expedition that had discovered this hide-out of renegades? Unknown and unsuspected Terran allies at long last come to the rescue? Mutineers led by Lakin? *Who?*

He rounded a corner so fast that he gave himself no chance to escape three armed Terrans charging along the corridor. They grabbed him even as he skidded to a stop. This trio were big, brawny, tough-looking, wore steel helmets, were smothered in equipment and bore automatic guns.

"What is meant by this?" shouted Zalumar. "Do you realize—"

"Shut up!" ordered the largest of the three.

"Somebody will pay for—"

"I said to shut up!" He swung a big hand, slapped Zalumar with force that rattled his teeth and left him dazed. "See if he's clean, Milt."

One of the others ran expert hands over Zalumar's person. "Nothing on him, not even a loaded sock."

"O.K. Toss him in that small room. You stand guard, Milt. Beat his ears off if he gets uppish."

With that, two of them hustled around the corner, guns held ready. Twenty more similarly armed Terrans appeared and chased after the first two, none of them bothering to give the captive a glance in passing. Milt opened a door, shoved Zalumar's shoulder.

"Get inside."

"To whom do you think you're—"

Milt swung a heavy, steel-tipped boot at the other's tail and roared, "Get inside when you're told!"

Zalumar got in. The small room held a long, narrow table and eight chairs. He flopped into the nearest chair and glowered at Milt who leaned casually against the wall by the door. A minute later someone opened the door and slung Lakin through. Lakin had a badly discolored face and a thin trickle of blood along the jawline.

"Arnikoj is dead," said Lakin. "Also Dremith and Vasht and Marjamian and half the palace guard." He touched his features tenderly. "I suppose I'm lucky. They only beat me up."

"They will pay dearly for this," promised Zalumar. He studied the other curiously. "I suspected you of disloyalty to me. It seems that I was wrong."

"One can foresee trouble without having to take part in it. I've known for long enough that Heisham was brewing something. It was obvious that sooner or later—"

*"Heisham?"*

"Yes. His term of service ended two years ago—and he was still here. He is not the kind to sit around and do nothing about it. So he waited his chance."

"What chance?"

"We maintain a permanent ships' guard of eighty men. Everyone serves in rotation. Heisham needed only to bide his time until he and a bunch of sympathizers were selected for guard duty. The ships would then be his to do with as he pleased."

"That would be of no use. He couldn't take away ten cruisers with a mere eighty men."

"He could make off with two ships, each with a skeleton crew of forty," said Lakin.

"The fellow is stark, staring mad," declaimed Zalumar. "Immediately he shows his face on Raidan he and all those with him will have to undergo interrogation, with torture if necessary. And when they've given up every item of information they'll be executed as traitors."

"Heisham doesn't think so," Lakin responded. "He is going to put all the blame on you. He's going to tell them that you prohibited the sending of a report because you wanted all the spoils and the glory for yourself."

"They won't take his unsupported word for that."

"There are eighty men with him and they'll all say the same. They've got to—they're in the same jam. Besides, he has persuaded the Terrans to confirm his story. When a Raidan commission arrives to check up the Terrans will give evidence in Heisham's favor. He's quite confident that this tactic will not only save his life but also gain him honor."

"How do you know all this?" demanded Zalumar.

"He told me of his plans. He invited me to come in with him."

"Why didn't you?"

"I didn't share his optimism. Heisham always was too cocksure for my liking."

"Then why didn't you inform me of this plot?"

Lakin spread hands to indicate helplessness. "What was the use? You'd have taxed him with treachery and he'd have denied it, knowing full well that you were already tired of my warnings. Would you have believed me?"

Letting that awkward question pass unanswered, Zalumar buried himself in worried thought, eventually said, "The Terrans will not support his tale. They have nothing to gain by doing so. It is of total indifference to them whether Heisham's gang live or die."

"The Terrans have agreed to confirm everything he says—for a price."

Leaning forward, Zalumar asked in tones of suppressed fury, "What price?"

"The eight ships Heisham could not take."

"Intact and complete with their planet-busting equipment?"

"Yes," Lakin brooded a moment, added, "Even Heisham would have refused such payment had the Terrans any idea of where Raidan is located. But they don't know. They haven't the slightest notion."

Taking no notice, Zalumar sat breathing heavily while his features changed color. Then suddenly he shot to his feet and yelled at the guard.

"You piece of filth! You dirty, lowdown animal!"

"Now, now!" said Milt, mildly amused. "Take it easy."

The door opened. Fox entered along with McKenzie and Vitelli. The latter bestowed on Zalumar the same unctuous smile that had not varied in six long years.

All three wore uniform and carried guns. Thus attired they looked much different; they'd acquired a hardness not noticed before. It wasn't quite like Raidan hardness, either. There was something else, a sort of patient craftiness.

Zalumar still had an ace up his sleeve; without giving them time to speak, he played it. "The ships won't do you any good. We shall never tell you where Raidan is."

"There's no need to," said Fox, evenly. "We know."

"You're a liar. None of my men would give you that information, not even a self-seeking swine like Heisham."

"Nobody did tell us. We found out from what they did not tell."

"Don't give me that! I—"

"It was a long and tedious task but finally we made it," Fox chipped in. "All your wandering, sight-seeing tourists were willing to talk, being lonesome and far from home. We chatted with them at every opportunity. Not one would say just where he came from but every one of them readily admitted he did not come from some other place. We have analyzed records of eighty thousand conversations spread across six years. By simple process of elimination we've narrowed it down to the system of Sigma Octantis."

"You're wrong," asserted Zalumar, straining to hold himself in check. "Dead wrong."

"Time will show. There won't be much of it, either. Maybe we could build a super-fleet by combining the virtues of your ships and ours. But we're not going to bother. It would take too long. We'll have learned how to operate your vessels before another day has passed."

"Eight ships against Raidan's thousands?" Zalumar indulged a harsh laugh. "You haven't a hope of victory."

"There will be no thousands from Raidan. We're going to send those ships hotfoot after Heisham. Even if they don't overtake him they'll arrive so close behind that the Raidan authorities will have had no time to react."

"And what then?"

"A new binary will be born."

There was a brief silence, then Zalumar rasped with all the sarcasm he could muster, "So much for your well-beloved basic right."

"You've got hold of the correct stick—but at the wrong end," said Fox. "The right we recognize is that of every species to *go to hell after its own fashion.*"

"Eh?"

"So when you arrived we were willing to help. It was a cinch. One naturally expects the greedy and ruthless to behave greedily and ruthlessly. You ran true to type." Taking his gun from its holster, Fox carefully laid it in the center of the table. "This is further assistance."

With that they went out, Fox, McKenzie, Vitelli and the guard named Milt. The door slammed shut. The lock clicked. Metal-shod boots commenced a monotonous patroling outside.

Zalumar and Lakin sat unmoving throughout the rest of the night and the whole of next day, staring blindly at the table and saying nothing. Toward dusk a tremendous bellowing sounded from the spaceport, screamed into the sky. Another and another, eight in all.

As the sun called Sol sank blood-red into the horizon, Zalumar walked ashen-faced to the table and picked up the gun.

A little later the patroling footsteps went away.

**THE END**

EXPLORING TOMORROW

THE first Science-Fiction radio show of science-fictioneers, by science-fictioneers, and for science-fictioneers—real science fiction, for a change!—is now being presented on Mutual Network, Wednesdays and Fridays, 8:05 to 8:30 p.m., Eastern Standard Time.

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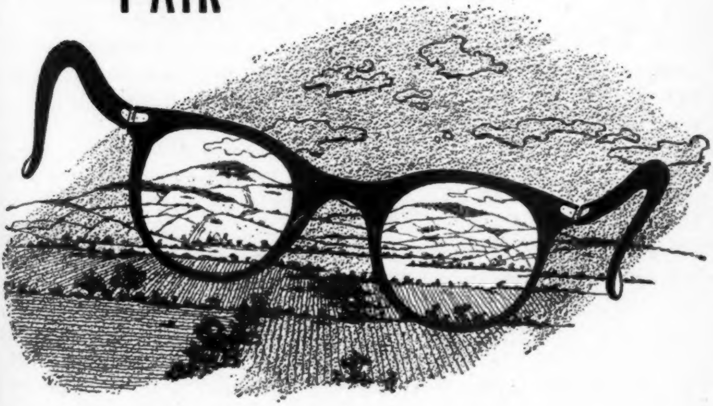
***EXPLORING TOMORROW—***

***MUTUAL NETWORK***

# A PAIR OF GLASSES



*A man may have an excellent and worthy goal in mind—but the man who works on process is more apt to achieve that goal!*

## BY JON STOPA

Illustrated by van Dongen

BEN RUZZO paused at the edge of the rutted road and stared at the plain wooden sign, his eyes slitted and watery, as he tried with his poor vision to capture the words scratched on it.

THIS IS
CORNING.
COME RIGHT IN.
GLAD TO SEE YOU!

His full, thick lips rolled in a slight sneer. He knew that on the other side it would read:

GOOD-BY.
COME AGAIN!
CORNING.

He turned and continued, stumbling on the unused, rotting concrete and catching himself with his stout cane, completely indifferent to the warm sun that breathed on his back, the fresh, green trees that clustered, dimly seen, to either side, and the vital sky that domed over him. His mind was withdrawn to a tiny corner of the vast old bag of bones that he liked to call his brief earthly abode, and was wrapped around, though he would rather die than admit it, the promise contained in the letter he had received from his old friend of youth, Roger Whitney—a pair of glasses.

Ben stopped for a minute to catch his breath as he came among the first cabins, leaning ponderously on his cane. At midafternoon the streets of the small hamlet were almost empty, although he seemed to hear children playing far away. He couldn't be sure, for his hearing of late had been erratic, at times almost normal, at times almost nonexistent.

The squeak of a wooden axle and the clatter of a heavy ox cart caused him to turn around. He ignored the half-naked little boy leading the two well-fed animals and hailed the older man in the empty box.

"Sir," he said, "could you direct me to Mr. Whitney's house?"

"It'd be the glass works that you'd be wanting. He don't go home until about sundown."

"Where is that?"

"Over on the other side of town. Here, why don't you be coming up here and I'll take you there?" He smiled broadly. "I'm going there myself."

Ben climbed up over the side and leaned heavily against the rude planks while he again caught his breath. "I'm not up to this sort of thing any more." The cart jerked slightly, and started moving forward.

For a few minutes nothing was said, and Ben strained his eyes to look at the crude buildings that they were passing. It was strange to see glass in windows again. "Tell me," he said, "is this really the old Corning?"

The other man shrugged expansively, then leaned over with an intimate smile. "Who knows? I can tell you this, though, before Mr. Whitney came here we called our town Bentwood."

"Oh?"

"Yes. But he seemed to think it more proper if we call it Corning, and I suppose he's right."

"I see." Ben withdrew into silence for the rest of the short trip, disgusted at the bald attempt to graft the traditions of the old Corning to the new one. It was as fake as the sign on the road just outside of town.

The cart came to a stop just outside of a shed, apparently the largest in town. The two men climbed out and headed inside, while the boy led the team into the shade.

Inside it was hot. Ben loosened his ragged homespun jacket and took off his wide brim felt hat, letting his long gray hair fall freely. In the center of the room stood a tall furnace, shaped somewhat like the slim end of an egg, and around it were a number of glass blowers and their apprentices working at the glory holes.

He was led into another room where three men were working over a much smaller furnace. It was a moment before his dim eyes could make out his old friend.

"Roger!" he said, his whole face swarming into a smile.

The thin master glass blower looked up, his face crinkling with an answering smile. "Just a minute." He turned back to the half finished goblet. Sticking the foot on a punty, he put the other end, which was still a bubble, into the furnace to soften it again, slowly twirling it to keep it from sagging.

After it had softened sufficiently, he instinctively pulled it out and quickly trimmed the bubble with a pair of shears. "Here," he said to his apprentice, "finish it."

Roger dismissed the driver that had led Ben to him, and both men walked out in back of the shop where the air was fresh and cool. "Well," said Roger, after they had embraced, tears in their eyes, "so you finally came, eh? I knew you would."

"Now, now, Roger," said Ben, lifting a protesting hand, "you know very well that I come, not for my own convenience or pleasure, but only so that I might do the work of the Colony with greater dispatch." His lips fluted slightly in each corner in a small smile. "After all, there are years of work yet in this fat old hulk of mine, and no reason why a little thing such as bad eyes should stand between it and me."

"Ha!" Roger slapped his thigh with a calloused hand. "That's a good materialist's way of looking at it!"

Ben looked up, staring into the distance that his vision would not reach. "Perhaps. We, at the Colony, have never denied the existence of that shabby illusion that you call reality—we are more interested in a more basic thing, the reality of the mind, the soul. Even you must admit, if I can ever make you admit anything, that the day of materialism is over, that even the scientists at the Denver Library have said so."

Roger was quiet for a moment, then he said, "I'm sorry, I cannot agree with you—for the very good reason that they never said any such thing. They said that we cannot come up the same road of technological development that we climbed before the war—for in climbing that one we destroyed each step in back of ourselves. We had destroyed the easy-to-reach surface oil, coal, uranium, and metal ores, and were reduced to digging deep into the earth with vast machines, and sifting from the seas with even vaster machines, for the vanishing minerals of the earth. Then the war destroyed the machines, and now we cannot reach the oil and coal and ore." He picked up a bottle that had been standing against the side of the building, and stared quietly into its empty interior. "Perhaps, if the Denver Library had not survived, you might be right." He looked up. "But it did, and since it did, we do not have to climb the same road—for we have merely been unhorsed. The problem, of course, is finding a substitute for the horse."

"What can substitute for the horse?" said Ben.

"Oh, a number of things, the ox, for one." Roger smiled quietly, but with only the corners of his mouth. He hefted the glass battle. "This could, if only this didn't happen." He threw it at a large stone step.

It shattered into a million glittering random shapes and sizes.

They went inside and Roger fitted Ben with a pair of temporary glasses—later, after he had rested from his travels, a more accurate fit would be made.

"Ben," said Roger, opening up a cabinet and taking out a wooden rack full of oddly framed glasses, "the thing I've always tried to tell you is that there are only two ways of looking at the universe. The first way—"

"Now, Roger," said Ben.

"Uh, uh, I've got you trapped, and for once you're going to listen to me. As I said, the first way is to assume that physical reality is an illusion, and that 'real' reality is in the mind. Here, try on this pair."

Ben accepted the glasses and balanced them on the bridge of his nose. He opened his eyes and peered through the round lenses, his eyes watering. If anything, his vision was worse. He took them off, and shaking his head to clear it, he handed them back to Roger. "These won't do."

"O.K.," said Roger, putting them back on the rack. He started hunting for a more appropriate pair. "This first way brought about the sort of thinking in Russia that set up the five-year plan with its impossible goals—and when these goals weren't reached, had to look for saboteurs instead of cussed nature to explain its failures." He put the rack back into the cabinet and pulled out another one. "The second way is one that assumes that the universe outside of our skin is real. Here, try these on."

Ben slipped the glasses on and opened his eyes. "Ah! Everything is so clear!" He rubbed his stubby fingers across his damp forehead. "But it is so confusing, there is so much detail."

"Once you get used to it you'll be able to see the relationships of all those details." Roger put the rack back into the cabinet, and slid the wooden door shut. No metal wasted here in hinges. "Again, as I was saying, this second way makes democracy possible—not only possible, but, as Russia found out and therefore joined our side against Red China, absolutely necessary. If every individual is in contact with a unique, obstinately real, fragment of the universe, it follows that each must be consulted before that reality is manipulated. It is no accident that the 'spiritual' East holds such little value in a human life."

Ben stood up, a gentle smile quivering in the corners of his mouth. He thought of reminding Roger how Aristotelian, how either-or his statements had been, but decided, remembering Roger's beliefs back in his youth, that saying so would be unkind. Instead he said, "Isn't it possible that there might be a third viewpoint, one that holds that the physical universe, while real, well . . . that perhaps there might be something of value in the other viewpoint?" He took off the glasses for the moment. To see so much all at once was painful.

Roger frowned for a moment, his thin brow twisting in on itself, then untwisted, his face smoothing into a wide grin. "That isn't a viewpoint, that's anarchy. To be, means to be related—how can you investigate a phenomenon if it is just as likely to have a physical cause as a whimsical one? An even better question is, why bother?"

Ben shook his head slowly and sighed. It was impossible to get through to him. How do you convince a blind man that there is such a thing as sight? He placed the glasses down on the table. Things might be clearer with them on, but he was more comfortable without them.

Roger put his arm around Ben's sagging shoulders. "Come," he said, "I'll have my wife fix something for you, and you must be tired."

"Yes, it was a long walk."

"Walk?" Roger looked up at Ben with a slightly startled expression on his face.

"Of course, how else would you expect *me* to travel?"

Roger opened his mouth as if to say something, then changed his mind. Together the two men walked out into the cooling air of late afternoon.

"Well," said Ben, once they had settled down on Roger's wide porch, "this is much better. Tell me, how can you stand that heat?"

Roger lifted a condensation covered glass of lemonade and took a small sip. "Oh, you become used to it after a while. It's like everything else, you can't have your cake and eat it, too."

Ben fingered his glass. "You know, this is the first unbroken bit of glass I've seen in years—strange, how even in such a simple thing memory displays its caprice. I had almost completely forgotten how a glass looked, how it weighed in the hand, how it felt against the lips."

"Oh?" said Roger, turning to him. "I'm surprised. I would think that by now my bottles and drinking glasses would have penetrated to almost all parts of the continent."

"It shouldn't be too surprising. I can remember telling you of the colony that was only a scheme in my head at the time—well, its all come true now. I've set up the colony, a place were a man can be a full, sane human being, in a full, sane culture—a culture that does not demand that a man kill his fellow man in that monstrous insanity called war."

"Hm-m-m . . . I seem to remember a bit of it now—weren't you going to pattern the colony after one or two south sea island cultures? I also remember my arguments against the idea. One of them being that those cultures developed in a particularly bounteous environment where no man had to exert himself to gain his wants. Another of them being that these cultures existed only in isolation from other cultures—the minute that these cultures did contact another one they collapsed. Both of these may be summed up in one little fact that you seem to enjoy ignoring: the fact is that the universe is hostile to life, and life, if it wishes to survive, must be prepared to fight for survival. If it doesn't, it's *dead*."

Ben couldn't resist a slightly smug smile. "Nevetheless, despite all of these arguments of yours, I have founded the colony, and it is successful—of course, I might add, in part because of your invaluable suggestions. The valley in California that I picked is quite fertile, and I have an agreement with the United States government that gives me complete autonomy."

"Pah!" Roger took a sip of the by now warm lemonade, and spit it out onto the grass with a sour face. "You didn't answer a single one of my objections, you merely got around them. Not everybody can live in a land of plenty, or be protected from other hostile peoples by the United States Archers—a group of men organized to kill, by the way. The closest that a sizable hunk of mankind ever came to living in a land of milk and honey was in the old United States—of course, your 'spiritual' friends from the East took care of that."

With a sigh, Ben said, "Look, I'm trying to create a sane culture—if you put a lamb in the center of a pack of wolves, do you mean to tell me that the lamb is insane and unfit for survival if it is killed?"

Roger slammed the empty glass down on the table, causing Ben's to leap into the air. "You're hopeless! You know very well that human beings are not lambs or wolves, they're *human beings!* If you must use a mataphor, use a lamb among lambs, a wolf among wolves—but I warn you that you'll get into trouble because you're talking about different things." He stood up. "Do you feel up to being fitted now? If we want to do it today, we'll have to start now while the sun is still good."

Ben nodded, and the master glass blower went into the house to get the testing equipment. How could he make Roger understand, he thought, and feel the truths that he *felt* and *knew?* It seemed like a hopeless task. The man refused to even look!

Roger came out of the house pushing a cart that contained a testing chart, a rack of lenses, and some equipment that Ben did not immediately recognize. He parked the cart next to Ben, after putting up the chart across the porch, and swung a wooden arm up and in front of his face. Onto this he attached some sort of lens-holding apparatus that was too close to Ben's face for him to make out the details.

"Now look at the chart," said Roger.

The fitting didn't take as long as Ben had expected, nor was it as difficult as he had feared. All he had to do was sit still while Roger changed lenses, switching from one eye to the other, and read the chart down as far as he could. There was a temptation to memorize the sequence of letters, but Roger had warned him against that, and so, fighting the part of his mind that wanted to naturally do the opposite of what it was told to do, he tried to pretend at each letter that he had never seen it before. Of course, this made it twice as difficult, but finally it was all over, and Roger went back into the house to start grinding his lenses.

The sun had lowered and reddened in the now lavender sky while the fitting had taken place, and it was now a bright little ball that threatened to singe the tops of the taller trees. Ben sighed and sat back, feeling quite tired, and not just a little bit lonesome for the mountains of his colony.

These flat lands, with their endless forests and hidden ruins, had a bad effect on his mental equilibrium, at times making him want to jump up, smash down all the trees for miles around, and scream against the sky! So far it had never happened, the smashing down of trees, that is, but the screaming had come pretty close to happening once or twice. Especially that time where he had gone for days with only seeing a few scattered fragments of blue through the hazy green overhead, then at last he had seen blue through the trees, and thinking it an open lake, had run to it—only to find that it was a little pond, not more than fifty feet across. That was enough to make anybody scream.

He sat there, half awake, half asleep, while the sun burned itself into the depths of the forest and then into the ground, and while Roger worked over the lenses that would let him see. No real thoughts went through his head, only quasi-thoughts —half formed blobs—meaningless, referring to nothing.

The sun had been long elsewhere when Roger came out and shook the weary traveler. "Why don't you come in and have a bite to eat?"

Ben's eyes slowly flowed open and he somehow managed to keep a small yawn from becoming a big one. "Why thanks, I think I will."

Supper was a pleasant affair, with fresh lake trout from nearby Lake Michigan, followed by a grapefruit hemisphere and coffee. It had been years since he had had *real* coffee.

Afterward, the two men wandered down to the edge of Lake Michigan, and sat on the bluff overlooking the water, the cool, black, gently lapping water. Ben lifted one of Roger's broad boled pipes to his lips and slowly drew in, letting his eyes play on the distant blurred image of the moon.

"Smell that air!" said Roger.

Ben exhaled, freeing the white smoke into the maiden night. "It *is* fine." They lapsed into silence again. Neither of them wished to interrupt the slow swelling and subsiding cycle of the night wind, the gentle sounds of the myriad creatures of the beach and wood in their agony of life and death, the sights, the sounds, the tactile sensations that had been at the water's edge before there had been an intelligent mind to interpret them, and, in all probability, would be there long after the last intelligent mind had dissolved into its component molecules and, minus identity, re-entered the life cycle. Ben's eyes followed the hazy glow of the milky way as it emerged from the silvered black liquid of the lake and climbed up into the sky over his head, and he wished now that he had not left the glasses that Roger had given him back in the shop. He looked at Roger, who was looking out over the lake abstractedly, and his brow crinkled and pressed together in a frown. There was something about the man that he couldn't understand, something that lurked hidden in his face, whether he was laughing or smiling or frowning, or, as now, quietly thinking. Something that he could only label as being childish, immature, and unresigned.

Ben looked closely at Roger's face, trying to find and define the essence that was so elusive. What was it? Was it awe and contempt at the same time, as if they were complementary emotions? Or was it acceptance and rejection—

"Well, what are you staring at?" said Roger.

Ben jerked up straight as he realized that Roger had noticed his gaze and had been returning it for the last minute, or so. "Why, I . . . I—"

"Never mind," said Roger, smiling, clasping his shoulder warmly. "I just wanted to see you jump!"

Ben was nonplused for a moment, then he forced a return smile that slowly grew wide, full, and real. "I was thinking," he said sheepishly.

Roger's face forced itself into a mold of mock sobriety. "A good sign," he said. "Was it about anything?"

"Now Roger, that isn't fair."

Roger pulled a pipe out of his pocket, slowly thumbed in a wad of tobacco, and stuck it between his teeth. "I guess it isn't," he smiled.

Ben puffed deeply while Roger lit a strip of paper from his pipe, then the two men smoked in silence again. Ben's gaze drew to Roger again. Could he ever make him understand? Could he ever make Roger *feel* and *know* the things that he knew and felt, or was the man's mind so closed that that was impossible? Again grew the hopeless longing for understanding, the eternally frustrated desire to communicate. For a moment he rejected another attempt, for Roger never paid any attention to what Ben said, he only quibbled about the way it was said. But finally his mind could not hold the words any longer, and let them go, sliding down his nerve paths, into his vocal cords, and out his mouth. "Roger, I can't understand how you, who are supposedly a scientist, can have such a closed mind, can refuse so stubbornly to communicate."

Roger lifted the pipe slowly from his mouth and set it down on a hunk of driftwood. and turned, facing Ben. "Because you don't *want* to."

"I *what?!!*"

"I said—"

"Now wait a minute, who is the one just now who attempted to communicate?"

Roger picked up his pipe and shoved it roughly between his teeth. "Let me put it this way, you *say* that you want to, but you really don't, because you refuse to allow order, and order in a nonabsolute universe is absolutely necessary for communication. Remember what you said about the wolves and lambs? When you said that, you implied that there is no difference between wolves and lambs and human beings, and further, you completely ignored the semantic import inherent in identifying humans with animals. Human beings are structurally different from all other animals in that that they not only can think and order existence, but *must* think and, therefore, order existence. When a law of nature limits sexual activity, something else must replace it—otherwise, lacking stability, there is no family, and therefore, no next generation.

"I suspect that the invention of the symbolic family is perhaps the determinant in the development of intelligence, for there is no reason for a symbolic family to disintegrate once the young are no longer helpless. How many symbols do you know that are meaningless, but still persist? And since the young can stay with their parents a little longer, they can, to a larger extent, learn more without going to the trouble of wasteful trial-and-error. In effect, instinct is less useful, and is therefore weaker, and the young must stay longer, et cetera. In other words, it's the sort of feedback effect you get when you stick a mike in front of its speaker. Do you see what happens when you deny order?"

Ben remained silent for some time. He disliked being lectured, and he couldn't quite see the relevance of Roger's argument. What did it have to do with him? Sure, he had made a mistake, but it only was a little unimportant one, not really enough to make a fuss about. "Look, Roger, I never denied the existence of order—I believe that if you knew every single thing that went into the making of an individual you could predict exactly what his reaction at any given instance would be."

It was Roger's turn to be quiet for a moment. "Well, outside of the fact that the very fact of observation creates imponderables, you must realize that thought is not a perfect analogue of reality, it only approximates it. Even given complete information, you'd have to recreate the conditions exactly to see what would happen—in other words, you'd have to reproduce your individual and then would have two of them."

"Well, surely, if we could, we could predict exactly."

"That's one mighty big if. If that is true, it means that we've been incredibly wrong in our most basic assumptions of the universe. But say, didn't you say something before about mind?"

"Yes, I did," said Ben, "although you never gave me a chance to explain. I believe—think possible—that there might be something above mundane reality that is in basic essence free of will; I call it soul, for want of a better term. Whether it exists, or not, I don't know."

"There! that's what I want to say," shouted Roger, yanking his pipe from his mouth. "Will you agree to the statement that anything is possible?"

Ben looked into Roger's face as sharply as his poor eyes and the dim moonlight would allow, looking for the trap that he knew must be hidden there somewhere. Should he say yes, or should he say no? He sighed, deciding that either way Roger would find something. "A qualified yes."

"How qualified?"

"Well, I don't know how to put it exactly, but as Hume once said, we have no *real* reason to expect that A causes B just because we've always noticed B following right after A."

'True—but not true enough. It is useful to assume that, until an instance occurs in which B does not follow A, that indeed this is a case involving causality, since if we desire B, and get it when we produce A, we have what we want—if, at some time in the future, we produce A and do not get B, we'll worry about finding another way to get B at that time. I think I've got a nerve here—*you refuse to make a decision.* As far as you are concerned, everything is possible because you don't want to turn your back on anything. In one breath, you say that you believe in a completely deterministic universe; the next, that you believe—a beautiful Freudian slip, you immediately changed it to 'think possible,' again leaving yourself an out—that there might be something above causality. You wouldn't give a yes or no answer to my next question—not a crime in itself, some questions cannot be answered without qualification—and you refused to give an exact answer—in your own words—when I asked for the qualification."

Ben opened his mouth to answer, completely forgetting the pipe stuck between his teeth, and it fell to the ground unnoticed. He wanted to shout *no,* he wanted to shout *you lie,* but nothing would come out. Nothing, absolutely nothing. He wanted to disbelieve it and couldn't. He wanted to believe it and couldn't. To his utter horror, he couldn't do either. Then slowly the things he believed in swelled out of the black tides of memory to the surface of his mind; the values that he held true, the worth of his work, the ultimate oneness of the universe. When he spoke finally, his voice was quite calm. "Will you excuse me, it's quite late and I ought to be getting to bed now."

Roger had been up for hours, and the sun was no longer fresh with the early morning. Ben found him in back of the shop underneath the high spreading branches of an old oak, quietly pumping the treadle that spun the lens grinder, his steady hand moving the polisher back and forth. "Morning, Roger."

"Hi, have a good sleep?"

"Fine, fine. I feel wonderful." Ben sat down on the bench alongside of Roger, with a sigh. He really *did* feel good. Maybe it was the long sleep, or the good food that did it. He sat quiet and content, watching Roger grind endlessly, occasionally changing the abrasive, then grinding again. "Say, Roger, I've noticed that you've got an awful lot of iron in your tools. Where did you get it?"

"Iron? Oh, that." Roger chuckled. "The Denver Library sacrificed an entire row of shelves to outfit me. It was quite a row, and I don't mean shelves, either."

"Oh." Ben frowned, perplexed. "Speaking of the Library, why are you here, way out in the middle of nowhere? I would think that you would want to be in the center of the academic life—instead you're isolated."

Roger smiled, but there was nothing soft in his face. "Well, partly because I like the sand better over here, but mostly for the very good reason that all that most of them are interested in doing is glorying in the greatness of the past, instead of trying to make something of the future. I'm here to escape them, but even so, one or two of them drop in on me every once in a while."

As if feeling he had to defend the academy for some reason, Ben shrugged his shoulder contemptuously, covering the shop with a sweep of his hand. "What is so important in what you're doing? After all, what is a little glass?"

"What is a little glass? I'll tell you what a little glass is." Roger stopped grinding. "With glass pots, families that have no metal pots now can cook in a more civilized fashion; those *with* them can free the metal for more important usages. With glasses we can put useless old men like you to work; with lenses work that couldn't be done before is possible. There are literally *thousands* of uses to which glass can be put! and

I've named only the ones that come immediately to mind."

"Enough, enough!" said Ben, holding his hands up and bowing his head in a mock cringe. "I believe you."

Roger didn't seem to hear him though. "Literally thousands of uses . . ." he said slowly. Suddenly he snapped back to the present, and leaned over, removing the lens from the polisher.

"Why, that's three inches across," said Ben, "that can't be one of my lenses, can it?"

"Of course not." Roger smiled, standing up. "I finished them last night."

"Why you old dog, you!" Ben poked him gently in the ribs. "Let me see them."

Ben climbed to his feet, and the two men started slowly back to Roger's home. As they walked Roger once more fell into brooding inwardness, and at last he said, "There is one other use for glass that is possible . . ."

"Possible?"

"Yes—here, I'll explain, but you'll have to allow me to go the long way around."

"O.K.," said Ben, but he had a feeling that Roger had only half heard him.

"You know, there was at one time a writer called Hermann Hesse, and some called him great—he had two watch words—*'be yourself,'* and he rejected what we call reality—property, comfort, 'common sense.' Instead he studied the 'spiritual' treasures of the East in search of individualism. But at the end of his life he realized that he was lost and he came back to a sort of neo-Catholic conservatism . . ."

"Now wait a minute," said Ben, angrily, "you cannot dismiss Hesse's attempts to understand the subconscious so lightly."

Roger stopped and looked Ben directly in the eyes. "Oh? I am dismissing him lightly, am I? Want to know something? It was Freud, a western scientist, who invented the concept of the subconscious, that gave us the first workable theory on how mind operated—not an Eastern mystic. Think about it." Roger turned away, falling once more into semi-abstraction. "Well, glass is like that 'individualism' that Hesse found in the East—it has no structure, to speak of, it is simply a liquid that has such a high viscosity that it ceases to flow —and like Hesse, who came back and finally invented his own structure, I'm trying to make a glass that will freeze, that will crystallize and have high mechanical strength. It has been done before, I read about it in a newspaper clipping, but there was no other information on it—nothing on what processes to go through, or what materials to use—so I am slowly trying every combination I can think of."

"Glass hard, you say? Like steel?"

"Yes."

"Why, I just read an article about that in a microfilmed magazine when I passed the Denver Library in New

Denver! All about how it had to be heated twice, and everything!"

Roger, grabbed Ben's arm. "What magazine did you find that in?"

"*Saturday Review,* June—sometime in the middle fifties. I forget exactly when . . ."

"*Saturday Review!* who'd of thought of it—just a second, I'll hop over and get that tape. I'll be right back." Roger Whitney disappeared in a flash.

*Literally.*

For a full second the words that would say that that was impossible, that Denver Library was a thousand miles away, wanted to tumble from his mouth, but couldn't. Roger was gone. Ben waved his hands through the space where he had stood. *Gone.*

For a moment, after the words had died away, his mind remained blank and empty, then slowly thoughts came back filling the horrifying void. He remembered the surprised expression on Roger's face when he was told that he had walked all the way here, he remembered the lemonade and the grapefruit, common enough at home, but impossible this far away, and he remembered the casual, oh so casual, hint that other scientists dropped in occasionally, even if they lived in New Denver. Then he remembered more things; he remembered what Roger had said about structure, and how Freud in applying structure to the mind was the first to get a glimpse at how the mind worked.

Everything was so confusing, there were so many details! For a moment longer he stood, his heavy body swaying slightly, then he turned and headed for the house. Roger would not be back for a while, since he first had to find the magazine. Funny, he thought, how he had always expected that, if anywhere, his Colony would be the place where the powers of the mind would be discovered. He walked up the steps, and was about to open the door, when he noticed a small box on the porch table. He leaned over and the letters spelling *Ben Ruzzo* became clear on the top.

He opened it, and took out the glasses and held them in his hand. Should he put them on? They would be uncomfortable for a while. For a moment longer he pondered, then he made his decision. He put them on.

Then he opened his eyes and looked out at the world.

# REVOLT!

## BY CHRISTOPHER ANVIL

***On a violently nonterrestrial planet, a man must have an immensely efficient protective suit. Ever think that such a suit could be too effective....***

Illustrated by van Dongen

COLONEL Matthew Crandall was in process of grinding the conceit off a new lieutenant when the message came in. The *ping* of the communications bell could barely be heard through the drone of the lieutenant's voice:

" . . . And, sir, a Space Force Second Lieutenant outranks a Planetary Development Technician 3rd by two grades. So I ordered him to stand aside. But this Third tried to act as if he hadn't heard me. He tried to precede me on board *Vengeance*." The lieutenant's chest expanded and his head tilted back. "And so, sir, I enforced my order!"

Crandall eyed the lieutenant with the look of a farmer who has his ax raised, but does not yet have the chicken's neck in the right spot on the block. Then the *ping* of the communications bell caught his attention. Crandall got up, stripped a piece of message paper from the transceiver and read:

Planetary Development H. Q.
Cygnes VI m 4
*to* Space Force H. Q., Cygnes III
Personal: To Col. Matthew Crandall.

Matt: Have just heard from Purcell. Three hundred latest model del-Grange mechanical suits en route from Purth, due today 01-23-2212. Three hundred sixty operators en route from Szalesh, due 01-24-2212, fully trained in Model C trainers. I intend give them brief practice in new suits, then get them down on surface of VI. Every indication VI is loaded with crude ore. I need your formal signature for first contact, pursuant Section 67b. Am sending courier with forms. Thanks.—Dave, David L. Paley, Chief, Planetary Development Authority, Cygnes.

Crandall read the message over, frowned and pulled a chair around to the transceiver. He rapped the date-time key, tapped out the heading, paused for a moment, thought, then went on:

Dave: Would like to do as you say, but Section 67b is plain that when I sign, I share the responsibility. You say new suits due here today, 01-23-2212, and the operators tomorrow, 01-24-2212; you propose give operators "brief practice" then send them down. My experience is, all new equipment has flaws. Gravity on VI is such that if flaws become apparent down there, we may have mess of big proportions to clean up. Let's go a little slow at first.—Matt, Matthew Crandall, Colonel, Space Force.

Crandall sent the message, turned back to his desk, and glanced at the lieutenant. Crandall rapped his fingers on the desk, looked steadily at the lieutenant, and waited.

The lieutenant started, as if he had been daydreaming. "It would," he said, "have been an insult to the Space Force, colonel."

"What would?" said Crandall.

"Sir?" said the lieutenant. "Why to let a Planetary Development Tech. 3rd precede a senior Space Force officer, sir."

Crandall let his glance stray to the small bar on the lieutenant's left shoulder. "What senior Space Force officer, lieutenant?"

"Senior to . . . to the technician, sir."

"Just how senior was the technician?"

"He was . . . just a Technician 3rd. Sir, if I had let him precede a senior—"

"A what?"

"A . . . A *ranking* Space Force officer, it would have been a . . . an insult to the service, sir."

"So you grabbed him and shoved him back?"

The lieutenant's face turned red, then white. "Sir, I *ordered* him to stay back. Then I . . . he didn't, and I had to *enforce* the order."

" 'Enforce' it. How did you do that?"

"I— Well, I used force, sir."

"Did you hit him?"

The lieutenant winced, then stood straight. "I just sort of— Sir, he acted as if—"

"Did you hit him?"

"I— No, sir. I just sort of, quickly pushed him aside, and got out in front of him."

Crandall looked steadily at the lieutenant, and watched as the phrase "got out in front of him" echoed through the lieutenant's mind.

The message bell pinged and Crandall stepped over to the transceiver. He stripped off the message and read:

Matt: I understand your hesitation, and regret it is my fault for neglecting to mention that suits will of course be thoroughly inspected and checked during interval before arrival of operators. DelGrange is a perfectionist in design, and of course these suits have already been checked by him, prior to being shipped. But we will check them again as ordinary routine.—Dave, David L. Paley, Chief, Planetary Development Authority, Cygnes.

Crandall scowled and tapped out his reply.

Dave: I appreciate the thoroughness of your preliminary check on the equipment. But what I have in mind is something that may not show up until the suits are actually in use down on VI. Then if we have committed ourselves by sending them all down, there will be nothing we can do in the heavy gravity down there till another bunch of suits and operators arrive. My suggestion is, that we follow your plan, but a little more slowly.—Matt, Matthew Crandall, Colonel, Space Force.

Crandall sent the message, went back to his desk, and scowled at the lieutenant. The lieutenant looked uneasy.

"So," said Crandall, "you shoved the Planetary Development man out of the way and squeezed out first?"

"Sir . . . it wasn't quite like that."

"Were you in a hurry? Official business?"

"I— No, I wasn't, sir, but—"

"You weren't?"

"No, I—"

"Were you, or weren't you?"

"No, but—"

"Then just what *was* your reason for shoving the Planetary Development man around?"

"I— It was a slur on the service, colonel."

"If you," said Crandall, "had been

a civilian on the spaceboat, and seen a junior second lieutenant wrestling with a junior technician to get out the hatch first, what would you have thought of the service?"

The lieutenant's face turned red. He struggled to say something, then merely looked sick.

Crandall added, "There's another little point here you might think about."

"Yes, sir?"

"Planetary Development often uses junior technicians as couriers. Sometimes they carry dangerous chemicals. At other times they carry delicate apparatus. There are occasions when these things are needed in a hurry. It would be natural for a junior technician to forget protocol."

"Yes, sir. I see. But this one—"

"Some small pieces of apparatus," said Crandall thoughtfully, "cost upwards of sixty thousand dollars."

The lieutenant looked totally blank.

The message bell pinged, and Crandall remarked, "At your present rate of pay, it could take you thirty years to pay off the damages. And, of course, it would come under the head of Destroying Government Property. Then there might be enough bad feeling to charge you with Conduct Unbecoming An Officer." Crandall got up and added thoughtfully, "I saw a sixty-year old lieutenant once."

He went over to the transceiver, stripped off the paper, and read:

Matt: I agree with you in principle, but the trouble in slowing things down is that we won't be in position for another drop till thirty days from now. This ore is vitally important back home. We have to send back as much as we can as fast as we can.—Dave, David L. Paley, Chief, Planetary Development Authority, Cygnes.

Crandall frowned, thought a moment, then sent:

Dave: If it will be thirty days till the next drop, I see your point. But I still think we should hold some of the suits in reserve in the event of emergency. — Matt, Matthew Crandall, Colonel, Space Force.

Crandall walked back to his desk and sat down. He observed that the lieutenant looked sick. "Sir," said the lieutenant, "I'm sorry. I should have known better. But this P. D. A. technician— *Was* this technician carrying anything? I didn't see anything, but—"

Crandall shrugged. "We haven't had a damage notice yet. Sometimes an interservice damage complaint takes time to clear through channels."

"Sir, I'm sorry."

"All right," said Crandall. "And remember one more thing when you're tempted to fight with an opposite number in Planetary Development."

"What's that, sir?"

"A pair of pliers," said Crandall, using an argument he had used many times before and found serviceable, "is a useful tool. But take out the little bolt that holds the two halves together, and those two halves, separated, aren't worth much." Crandall leaned back and heard the message bell *ping* again. "Planetary Development," he said, "and the Space Force, are like the two halves of a pair of pliers. You don't want to hurt the co-operation that holds them together. Remember that."

"Yes, sir," said the lieutenant fervently. "I'll remember."

They exchanged salutes. The lieutenant about-faced, and left the room. Crandall got up and stripped another message from the transceiver:

Matt: Everything we hold back will be out of action and useless for thirty days. Every operator held out will result in thirty man-days totally and irrevocably lost. They need this ore back home. Please give me your signature on my original plan as soon as possible.—Dave.

Crandall took a deep breath.

The intercom buzzed, and Crandall turned to snap it on.

"Sir," said a voice. "There's a courier from Planetary out here. He's got a Triple-A priority. Should I send him in, sir? Or just the papers?"

"Just the papers."

"Yes, sir."

A tall sergeant brought in a sheaf of papers, and Crandall scanned them carefully. He looked up at the sergeant. "Make out exact duplicates of these papers, but substitute the figure 276 for 300 in this item '300 delGrange suits and 300 operators.' "

"Yes, sir."

Crandall went back to the transceiver.

Dave: I have received your suggested plan. While I agree this would be excellent if we knew more about these new suits and about VI, right now I don't think we should take the risk. Thirty man-days wasted is a serious thing, but what we have at stake is a total of nine thousand man-days. While I agree with you in principle, I can't agree in detail. To save delay, I am having a new set of papers made up, will sign them and send them back with your courier.—Matt.

A brief pause followed, and an answering message came in:

Matt: How many suits are you planning to hold out?—Dave.

Crandall sent:

Dave: Twenty-four.—Matt.

The sergeant came in with the revised sheets, and Crandall signed them. The message bell pinged.

Matt: Twenty-four is damned near a fourth of one hundred, or about one-twelfth the whole force. What are you trying to do, hamstring me?—Dave.

Crandall puffed out his cheeks.

Dave: The only prudent thing to do is to reserve at least some small force in the event of emergency. There may be new developments. In thirty days we may need these suits. Twenty-four suits is only eight per cent of your total force. This is a very modest reserve.—Matt.

Matt: We aren't fighting a war on VI. What do we have to hold out any "reserve" for? Our only enemies down there are gravity and pressure. What you are asking me to do is to sacrifice three thousand six hundred man-days to satisfy your misplaced military notions. Planetary development isn't war. There is no enemy down there. There is no need for a reserve. Our job is to get up the ore as fast as we can in as large a quantity as possible. Kindly sign my original papers and send them on immediately.—Dave.

Dave: If I have to sign and share responsibility for an action, I feel entitled to have some share in planning it. If you don't like the word "reserve," call it "safety factor." Whatever you call it, it is only eight per cent, and it is a provision that seems vital to me. How can you or anyone else predict that nothing unexpected will happen on VI? I realize you are anxious to get up as much ore as you can. So am I. But if you have to cut potential production slightly to create a workable margin of safety, it seems to me we had better do it.—Matt.

Matt: I don't know how else to get it across to you, so let me tell you a story: Two men in a small town each had a thousand dollars. One put all his in a checking account where he could get at it. The other—just to have a little reserve—put eighty dollars of his money in a savings account where he had to give thirty days notice to get his money out. A chance came up to buy a local business. Both men wanted it, but the man who could put up a thousand dollars cash got it, because he could offer eighty dollars more than the other man. The business prospered. The man who bought it got rich. The other man soon spent what he had, and ended up worthless. All for what? For eight per cent held back.—Dave.

Crandall read the last message over three times, and loosened his collar.

Dave: I certainly do appreciate your care in explaining it all to me so carefully. Let me just ask you about one little point: What happens if the business goes bust?—Matt.

Matt: Colonel, will you or won't you let me do this thing my way? This is my field, not yours.—Dave.

Dave: It seems to me your field and mine come together at this point. Evidently the people who framed Section 67b thought so, too.—Matt.

Matt: Will you or won't you?—Dave.

Dave: We need twenty-four suits in reserve.—Matt.

Matt: Let me offer one final compromise. I will consent, freely, to hold two—or, if you insist—even up to four of these suits "in reserve." But I positively, definitely, and flatly refuse to keep two dozen of the latest and most advanced delGrange suits floating around in cold storage for a whole month because of your fossilized notion of a military "reserve." This is not a military matter. This is not your field. You are not competent to meddle in it. The signature that you are so concerned about is a mere formality, and Section 67b is well-known to be merely a sop to military pride. Whether things go right or wrong here is up to me, not you. You won't be investigated if things go wrong. I will. But this planet has been checked and rechecked, and this whole affair has been planned with a precision you cannot appreciate. I flatly refuse to jeopardize Earth by doing as you say. Don't intrude where you aren't fitted to operate. I very strongly suggest to you, colonel, that you sign the original papers without further delay.—Dave.

Crandall walked across the room, came back and tapped out an answer:

Dave: I am very sorry that we can't seem to adjust this matter quietly. No doubt you have your reasons, but I have mine, too. I cannot read the intent of Section 67b, or any other part of that section, as any other than what is written there. I have to follow it implicitly, and it is as binding on you as it is on me. I fail to see what enrages you at the thought of keeping eight per cent of these mechanical suits as a reserve against emergency. But I cannot fail to observe the meaning of your sentence beginning: "But I positively, definitely, and flatly refuse to keep two dozen of the latest and most advanced delGrange suits . . ." Considering Section 67b, this is not a matter of choice on your part, yet you "flatly refuse" to carry it out. I am sorry, Dave, but you haven't left me a great deal of choice.—Matt.

Space Force H. Q. Cygnes III
*to* G. H. Q. Space Forces, Terra
Staff

Pursuant Section 67c rpt 67c a State of Emergency is rpt is hereby declared throughout Cygnes System.—Matthew Crandall, Colonel, Space Force, Commanding.

Space Force H. Q., Cygnes III
*to* Planetary Development H. Q.
Cygnes VI m 4
Staff

You are hereby notified that pursuant to Section 67c rpt 67c, a State of Emergency has been declared throughout Cygnes System.—Matthew Crandall, Colonel, Space Force, Commanding.

Space Force H. Q., Cygnes III
*to* Planetary Development H. Q.,
Cygnes VI m 4
Personal: To D. L. Paley. Chief

Sir: You are rpt are hereby required and directed to retain twenty-four rpt twenty-four latest model delGrange mechanical suits as emergency reserve, as outlined in preceding correspondence. You are rpt are hereby warned that failure to do so will be cause for summary suspension from office pursuant to Section 67d. You are hereby directed to state your intention to comply with this order.—Matthew Crandall, Colonel, Space Force, Commanding.

Planetary Development H. Q.
Cygnes VI m 4
*to* Space Force H. Q., Cygnes III
Personal: To Col. Matthew Crandall

Sir: I positively, flatly, definitely, and finally refuse rpt refuse to obey any order, directive, proclamation or ukase that requires me or any of my organization to hold two dozen of the latest model delGrange suits in a state of futile lassitude while Terra hungers for ore. That is final.—David L. Paley, Chief, Planetary Development Authority, Cygnes.

Colonel Matthew Crandall leaned back and studied the message with a sensation almost of suspended animation. He found himself turning the message over to look at the blank reverse side of the sheet. He asked himself what, exactly, was so bad about keeping twenty-four pressure suits in storage for a month? He reread the message, shook his head, and tapped out:

Space Force H. Q., Cygnes III
*to* Planetary Development H. Q.
Cygnes VI m 4
Personal: To D. L. Paley, Chief

Sir: Pursuant to Section 67d, you are hereby suspended from office.—Matthew Crandall, Colonel, Space Force, Commanding.

Space Force H. Q., Cygnes III
*to* Planetary Development H. Q.,
Cygnes VI m 4
Staff

Pursuant to Section 67d of the Interservice Code, David L. Paley is rpt is hereby suspended from office. His successor is hereby required and directed to either: a) retain twenty-four rpt twenty-four latest model delGrange mechanical suits as emergency reserve, as outlined in preceding correspondence with D. L. Paley, former Chief; or b) clearly state reasons why this should not be done. His successor is hereby directed to state his intention to comply with this order.—Matthew Crandall, Colonel, Space Force, Commanding.

Planetary Development H. Q.
Cygnes VI m 4
*to* Space Force H. Q., Cygnes III
Personal: To Col. Matthew Crandall

Sir: I hereby state my intention to refuse rpt refuse to obey your order to retain twenty-four latest model delGrange suits as "emergency reserve." You are perfectly free to suspend me and choose the next man in line as new Chief. You may, if you want, go all the way down the line in this fashion. Upon inquiring of the person directly under me, I have been informed that all Planetary Development personnel who have expressed an opinion on this topic unanimously resent your high-handed approach to a situation you are incompetent to judge. I advise you to rescind your silly order before you make a complete fool of yourself.—Peyton B. Jones, Acting Chief, Planetary Development Authority, Cygnes.

Space Force H. Q., Cygnes III
*to* G. H. Q. Space Forces, Terra
Staff

Pursuant Section 68a rpt 68a, martial law is rpt is hereby established throughout Cygnes System.—Matthew Crandall, Colonel, Space Force, Commanding.

Space Force H. Q., Cygnes III
*to* Space Forces Cygnes
Staff

Effective immediately rpt immediately carry out Schedule Three rpt Three, Deployment for Sabotage Control. Any or all Terran or other ships attempting to evade or oppose this order are to be boarded, their personnel confined to locked quarters, and their officers removed and held under guard. Any ship attempting to escape is to be warned, and if it does not promptly submit, you are hereby directly ordered to destroy rpt destroy it. — Matthew Crandall, Colonel, Space Force, Commanding.

Planetary Development H. Q.,
Cygnes VI m 4
*to* Space Force H. Q., Cygnes III
Personal: To Col. Matthew Crandall

Matt: Good God are you out of your head? You can't shoot at our men. This is just a jurisdictional matter. You don't understand. Try and be reasonable. The press will have your head if you start any shooting.—David L. Paley, Chief (Suspended), Planetary Development Authority, Cygnes.

Space Force H. Q., Cygnes III
*to* Planetary Development H. Q.,
Cygnes VI m 4
Staff

You are hereby notified that pursuant to Section 68a, martial law has been established throughout Cygnes System. Pursuant to Section 67d, Peyton B. Jones is rpt is hereby suspended from office. His successor's name is to be sent to Space Force H. Q., Cygnes III, immediately.—Matthew Crandall, Colonel, Space Force, Commanding.

Planetary Development H. Q.,
Cygnes VI m 4
*to* Space Force H. Q., Cygnes III
Staff

John R. Hennings is successor to Peyton B. Jones.

Space Force H. Q., Cygnes III
*to* Planetary Development H. Q.,
Cygnes VI m 4
Personal: To J. R. Hennings, Chief

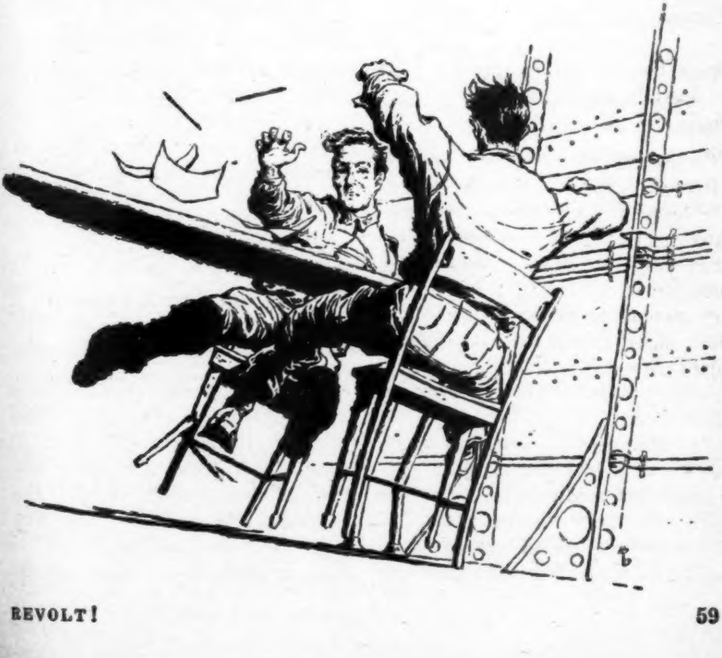
Sir: You are hereby authorized and

directed to fully acquaint yourself with the messages passed between your two previous superiors and myself regarding latest model delGrange mechanical suits en route from Purth, due 01-23-2212, and especially regarding retention of twenty-four rpt twenty-four of those suits as emergency reserve.

You are hereby directed to inform me of any reason why these suits cannot be retained as emergency reserve, or of any reason why, in your opinion, such retention would be disastrous or dangerous. My intention is to order you to hold twenty-four of these suits in reserve if you do not give any logical and satisfactory reason why this should not be done.

In present circumstances, your refusal to carry out such a direct order would result in immediate trial by military court. You would be accused of attempting to block by your disobedience the extraction of vital ore from Cygnes VI, thus endangering the security of the race. The formal charge would therefore be treason. The punishment if found guilty will be death.—Matthew Crandall, Colonel, Space Force, Commanding.

Planetary Development H. Q.,
Cygnes VI m 4
*to* Space Force H. Q., Cygnes III
Personal: To Col. Matthew Crandall



Sir: I see no reason why retention of such a reserve would be disastrous or dangerous, unless it cut down ore production sufficiently to produce a dangerous shortage. I will of course obey your orders to the best of my ability.—John R. Hennings, Acting Chief, Planetary Development, Cygnes.

Later in the day, Crandall received a damage claim against the lieutenant for:

1 pipet, 25 ml., smashed $2.75

Crandall took the time to pay it out of his own pocket, saying nothing to the lieutenant. Then he got back to work.

He spent an hour carefully going back over the successive messages. Try as he might, he could not see what had gone wrong, or spot any single place where it happened. Things just seemed to pile up with no sensible reason. Then he began to notice sentences here and there in the Planetary Development messages:

"This ore is vitally important back home."

"Everything we hold back will be out of action and useless for thirty days."

"How many units are you planning to hold out?"

"Twenty-four is damned near a fourth of a hundred, or about one-twelfth the whole force. What are you trying to do, hamstring me?"

"What you are asking me to do is to sacrifice three thousand six hundred man-days to satisfy your misplaced military notions."

"I flatly refuse to jeopardize Earth by doing as you say."

Two more lines popped out, from Paley's jittery last message:

"This is just a jurisdictional matter."

"The press will have your head if you start any shooting."

Crandall squinted hard at this last sentence. How, he asked himself, had the press gotten into this already? He looked up as an unpleasant possibility began to form in his mind.

Just then, the message bell rang:

G. H. Q. Space Forces, Terra
*to* Space Force H. Q., Cygnes III
Personal: To Col. Matthew Crandall

Would you mind telling us exactly what is going on out there?—G. C. Davis, General, Chief of Staff.

Crandall relayed the entire correspondence from beginning to end to G. H. Q. on Terra. Before this had time to reach Terra, Crandall received a second message:

G. H. Q. Space Forces, Terra
*to* Space Force H. Q., Cygnes III
Personal: To Col. Matthew Crandall

We now have a three-ring circus and medicine show in operation here. Planetary Development G. H. Q. is handing out generalities about military callousness, waste and stupidity, and they have scheduled a mammoth press conference for tomorrow. Unless you would like to spend the rest of your life plotting asteroid maps, you had better send us full and complete information and get it here well before the press conference opens.—G. C. Davis, General, Chief of Staff.

Crandall immediately sent a series of specially scrambled queries to staff officers he knew on Terra. When he had finished, the message bell pinged, and the transceiver unrolled a brief message:

T. S. F. Corvette *Lightning Bug*
*to* Space Force H. Q., Cygnes III
Staff

Planetary Development Communication Ship *Flash* disobeyed order to end transmission as per Schedule Three rpt Three. I at once carried out Radio Subrelay Jamming Directive, and have also boarded *Flash,* confined crew, arrested and removed officers.—L. S. Daniels, 1st Lieut., Space Force, Commanding.

Crandall promptly sent L. S. Daniels, 1st Lieut., his personal commendation. Then the transceiver went into operation again:

G. H. Q. Space Forces, Terra
*to* Space Force H. Q., Cygnes III
Personal: To Col. Matthew Crandall

We have received your long message here, and while I do not claim to have digested it all, I think I see what happened, and I imagine you see it too by now. It is all very neat, smooth, and nicely put together, with a strong spring and good sharp teeth in it, like a bear trap under the leaves. I fail to see what else you could have done that would not have compromised our security. But I don't know if that is going to help or not. I will not try to advise you at this distance, except in generalities: 1) Don't worry about us at this end; we will cover you and keep the avalanche off your head as long as possible, 2) Waste no time thinking about the unpleasant possibilities; keep your mind working on the pressing details. 3) This may seem a little hackneyed, but I would advise you to take a few moments and pray.—G. C. Davis, General, Chief of Staff.

Crandall thought it over, and took a few moments for fervent prayer. Then the bell pinged, and a number of freshly unscrambled messages came in, in reply to his queries. Most of these messages were signed by staff officers and were headed "G. H. Q. Space Forces, Terra." They went on to say:

Matt: Regarding the new delGrange pressure suit—it must be a classified Planetary Development exclusive. We have nothing solid on it, just rumors. If there's any reason why some of the suits can't be held in hand as a reserve, Paley should have given you the reason. We don't know enough about it to say one way or the other. On the other hand, of course, Paley or his successor can stand you off indefinitely by looking virtuous and saying "Classified." All that we can say back here is, we wish you luck.

Matt: You're right, and the Chief did perhaps put a little bit of a squeeze on our friends here in the sister service a few weeks ago. I know we should never underestimate our friends. But this business you describe shows such fast reactions, and such slick knife work, that I just can't believe it. Are you sure this isn't a misunderstanding?

Matt: We have dug up Paley's record for you. Also those of his top aides. The aides are more or less conventional. But here are some points on Paley: Graduated *cum laude*. Major: Business administration. Minor: Renaissance history. Joined P. D. A. young and rose fast. A number of interesting articles published in historical journals. Example: "The living influence of Machiavelli in Post-Renaissance Italy." Paley's nickname in college: "The Op." Paley's favorite game: Go. Has high efficiency rating and said to be fanatically loyal to P. D. A. Many minor brushes with military while in lower positions, but none later on. At least none recorded.

Matt: Press reaction here violent. Newspapers, magazines, radio, trideo, solideo, and 6-V are booming versions of two stories: a) You have shot your opposite number and are running Cygnes as a military dictator. b) Planetary Development tried to seize Cygnes with new secret weapons, and you are now locked in last-ditch death struggle to save Cygnes for Earth. Hard to say whether you're villain or hero, but you're notorious, anyway.

Crandall studied the messages carefully and gloomily, then checked to make sure the rigorous routines of martial law were being carried out. He ate, thought over the whole matter, then fell into an exhausted sleep. In his dreams he was a young second lieutenant, and a brisk colonel was saying to him, "Never fight with your opposite number, lieutenant. The Space Force and Planetary Development are just like two halves of a pair of pliers; you have to take care of that little bolt of mutual trust and co-operation that joins them together. Never fight with your opposite number, lieutenant. The Space Force and Planetary Development are just like two halves of a pair of pliers; you have to take care of that little bolt of mutual trust and co-operation that joins them together. Never fight with your opposite number, lieutenant—"

Crandall woke up with a headache and a general feeling of fuzziness. The first news he received was that the latest model delGrange mechanical suits had arrived from Purth during the night. The next news was that the operators had arrived from Szalesh in the early morning, had put on the suits, and practiced in them. Immediately afterward, he received a message:

Planetary Development H. Q.
Cygnes VI m 4
*to* Space Force H. Q., Cygnes III
Personal: To Col. Matthew Crandall

Sir: At 0630 TCT this morning, I sent down to Cygnes VI the reduced force of delGrange mechanicals with their operators. In obedience to your orders, I have, as you require, held back from the mining operation a full two dozen—twenty-four—latest model delGrange mechanicals along with over seven dozen operators. These tremendous machines and their highly-trained operators cannot, as we informed you time and again prior to your imposition of martial law, take part in the mining operations for over four weeks more. Because of your order, these huge engines and their skilled operators must now be held idle at tremendous expense to the taxpayers.

While I certainly do not desire that I or any of the Planetary Development organization be shot dead for saying so, still I would very respectfully like to make, sir, a suggestion. Perhaps, sir, you did not create this terrific waste intentionally, but were misled into causing this expense by the temptation to activate the obsolete Sections 67 and 68 of the Interservice Code. I say this, sir, with no intention or desire to be shot for treason for making the suggestion, but because—logically, sir—I think you should somehow come to realize fully just what damage these Sections 67 and 68 are doing to Terra.—Obediently, John R. Hennings, Acting Chief, Planetary Development, Cygnes.

Crandall read this over three times. Hitherto, the new delGrange devices were "suits," now they were "mechanicals," "huge engines," "tremendous machines." Crandall looked hard at various parts of the message, checked this one with previous messages, then tapped out:

Space Force H. Q., Cygnes III
*to* Special Service Command
Staff

Unpack and set up immediately one (1) gallows, portable, M12, using the nearest plot of ground convenient to H. Q. prisoner detention area. —Matthew Crandall, Colonel, Space Force, Commanding.

Space Force H. Q., Cygnes III
*to* Planetary Development H. Q.
Cygnes VI m 4
Staff

Pursuant to Section 67d, John R. Hennings is rpt is hereby suspended from office. His successor's name is to be sent immediately to Space Force H. Q., Cygnes III.—Matthew Crandall, Colonel, Space Force, Commanding.

Space Force H. Q., Cygnes III
*to* T. S. F. Cruiser *Vengeance*
Staff

The following personnel are to be placed under arrest and delivered to H. Q. prisoner detention area:

1) David L. Paley
2) Peyton B. Jones
3) John R. Hennings

These men are to be held separately under close guard. They are not rpt not to be allowed to communicate with each other, or with outsiders. They may, if they so request, receive religious guidance and counsel from chaplains of their own faith.—Matthew Crandall, Colonel, Space Force, Commanding.

Planetary Development H. Q.
Cygnes VI m 4
*to* Space Force H. Q., Cygnes III
Staff

James L. Buzzel is successor to John R. Hennings.

Space Force H. Q., Cygnes III
*to* Planetary Development H. Q., Cygnes VI m 4
Personal: To J. L. Buzzel

Sir: You are hereby required and directed to immediately prepare for inspection one rpt one latest model delGrange mechanical suit.—Matthew Crandall, Colonel, Space Force, Commanding.

Space Force H. Q., Cygnes III
*to* Special Services Command
Staff

Obtain the names of the next-of-kin of the following:

1) David L. Paley
2) Peyton B. Jones
3) John R. Hennings

Forward these names to this office as soon as possible.—Matthew Crandall, Colonel, Space Force, Commanding.

Crandall pulled a handkerchief out of his pocket and mopped his forehead. He ordered a light scout spacer gotten ready, then turned as the message bell pinged again. He read:

G. H. Q. Space Forces, Terra
*to* Space Force H. Q., Cygnes III
Personal: To Col. Matthew Crandall

For your information, we have learned that Planetary Development G. H. Q. is readying bill to strike out Sections 67 rpt 67 and 68 rpt 68, and replace same with new sections placing Planetary Development Authority in charge of Space Force in order to quote eliminate confusion end-quote. —G. C. Davis, General, Chief of Staff.

The intercom buzzed and Crandall flipped it on.

"Your ship's ready, sir."

Crandall boarded the spacer. Several times on the trip to Planetary Development H. Q., he found himself wondering whether asteroid plotting would be such a bad life after all. He forced his mind back to reality, then was interrupted by a startled grunt from the pilot.

Crandall looked up. "Now what?"

"Look at the upper right of the screen, sir. Coming into view as we turn."

Crandall bent forward and looked at the upper right section of the screen. He saw what looked like a huge spindly webwork, interspersed with big shiny rectangular blocks. As the ship turned, more and more of this web came into view, till it filled the screen from right to left and top to bottom.

"What in space," said Crandall, "is that?"

"I don't know, sir."

Crandall and the pilot sat, squinting, each man turning his head to different angles, trying to reduce the monstrosity to some familiar pattern. Abruptly the pilot switched on his microphone and began barking queries. He blinked, scratched his head, and turned to Crandall.

"Sir, Planetary says that mess is 'one dozen mechanical suits.' There's another dozen around the other side of the base."

Crandall let his breath out with a hiss. He fastened his gaze on one of the long strands of the web. Close observation showed at intervals, what appeared to be joints, and on the underside of the thing, a row of sharp metal teeth. Crandall traced along the arm to a thing like a shiny boxcar. From this boxcar stretched thick cables that twined like long metal snakes. Crandall leaned forward and enlarged the scene. From one end of the boxcar jutted a thick bar bearing a flat base with a curved transparent cover. Inside the cover, grids, loops, and V's turned listlessly. A big gray crate was fastened by loose cables to the end of the boxcar.

Crandall readjusted the focus of the screen for an overall view. There were many of these floating boxcars and crates. When he counted them, he found a dozen of each. They were all intertangled. The teeth on jointed arms had hooked cables, the cables were caught around the short bars between boxcars and housings, and eccentrically-attached conveyer belts floated loose and free from the boxcars, tangled at random with long metal arms, cables, and each other. The whole mass wavered and rippled with a slow motion, like seaweed under water.

"Sir," said the pilot, "there goes one of their dock-you ships."

"Their what?"

"Dock-you . . . Documentary ships, sir. They make surveys on new planets, take before and after pictures, and so on.—Funny to see one out here."

Crandall studied the documentary ship with narrowed eyes. The ship raced forward, slowed with a blast of rockets, lit with winking flashes of light—presumably a signal that it was taking pictures—then darted up, slowed, eased back and forth, and lit with more flashes of light. It rushed off to a new position.

"Sir," said the pilot, "they're sending up the technicians."

"Tell them," said Crandall, "that I want to see Buzzel, too."

Crandall boarded the Planetary Development ship with the feelings of an explorer starting across a swampy tract where the bog grass stands in clumps amidst sinkholes of bottomless muck. Buzzel, on his part, greeted Crandall with the calculating wariness of a zoologist transferring a captured hornet to the cyanide bottle. The two went to a small conference room, and opened a conversation that circled in gingerly from the general to the particular, till Buzzel asked:

"Why did you have to hold two *dozen* of them?"

"Why wasn't I told they were so big?"

Buzzel gave a spare smile. "Classified."

"What," said Crandall, "will you do if something *does* go wrong down there?"

"What could?"

Crandall shook his head, as if to brush away a swarm of gnats. "Suit failure," he said. "The breakdown of one small part in any vital place. Or psychological difficulties on the part of the operator."

Buzzel frowned, then said positively, "Those suits are mechanically and electronically perfect. DelGrange assembled them and tested them himself in conditions comparable to those here on Cygnes VI." Buzzel relaxed. "What more could you ask?"

"A test on the spot," said Crandall. He scowled. "How do you get those suits down through VI's atmosphere without burning them up?"

Buzzel gave his spare smile. "Classified."

Crandall felt his collar get tight.

Buzzel raised a hand and said cautiously, "I don't mean this offensively, but I think it ought to be said. You have your job. We have ours. I wouldn't presume to advise you in carrying out a fleet action. How do you suppose it makes us feel to have the military riding herd over us in our job?"

"The occupation of any new planet," said Crandall harshly, "involves risk and uncertainty. The Space Force is geared to act fast and strike hard in the event of trouble. Planetary Development is geared to make the most of a stable, predictable situation. When we make the first sizable landing on a new planet, we don't know *what* the situation is going to be. That's why we're both concerned. It's as much my job as yours."

"But under Sections 67 and 68, *you* have the final say." Buzzel frowned. "The evaluation of the situation properly belongs to *us*."

Crandall shut his eyes and took a deep breath. "That's beside the point. Sections 67 and 68 *are already law*. If we aren't to have chaos, we have to obey the law. If you want a change, all right. But this isn't the time or the place to make propaganda for it."

Buzzel looked at Crandall with something approaching compassion. "Even if you know you're right, how do you rouse popular support for your side without a striking incident? If the law forbids you to make the incident, how do you ever get a change so long as you obey the law?"

Crandall studied the tabletop as Buzzel went on. "I don't have anything against you, personally, colonel. I'm sorry if anyone gets hurt, but the principle involved outweighs personalities. Paley could explain this to you much better than I, but I'll try. Let me tell you a little history. The first concern of man used to be food. The hunter was paramount. Then tribes and nations arose, and there were battles between them. The warrior was paramount. That day, colonel, has faded into the day of science. The most important concerns have become, not military, but scientific. Today, the scientist is paramount."

Buzzel hesitated. "Paley could explain this much better than I. I used to accept Sections 67 and 68 as just ordinary aggravating routine. Now I can see that those sections are fossilized structures that we have to get rid of."

Crandall said, "Which is higher, Buzzel, the brain, or the spinal cord?"

"The brain, of course."

Crandall nodded. "Which is superior, a fully organized thought, or a reflex?"

Buzzel frowned. "A fully organized thought. What are you driving at?"

"As man developed," said Crandall, "did he subordinate everything to his brain? Did he subjugate all the mechanisms that went before to this latest and best one? If somebody slings a brick in your face, which has precedence, a calm, orderly estimate of all aspects of the situation, or a quick duck?"

Buzzel looked steadily at Crandall. "All right. But what does that have to do with *this* situation? There's no danger here."

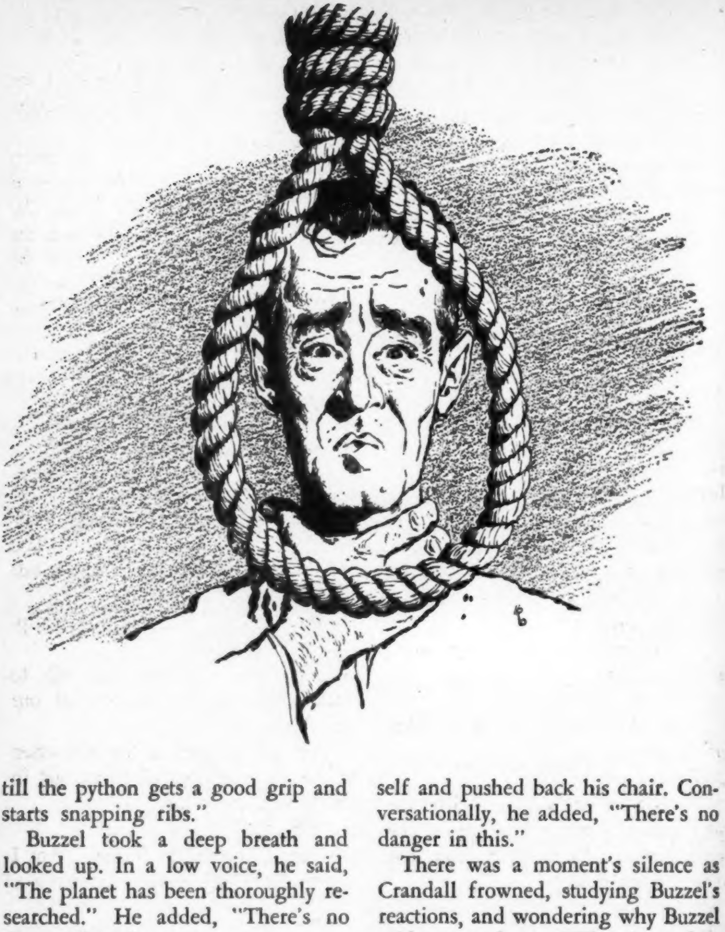
Crandall said, "If a man looks at a python through two-inch glass, and the python strikes at him, will the man stand still, smiling, or will he jump? The reflex gives him the advantage of fast action in the event of danger. The disadvantage is, he may act fast and waste energy when there's no real danger. But it has to be that way. Otherwise the reflex would have to stop and consult the brain, which would take twenty or thirty seconds to hand down a judgment on whether the python was really dangerous or only seemed to be. The man could be pulp by that time."

Buzzel stared at the opposite wall. "I see what you mean. A simple mechanism may have precedence over a higher one. But how— Where does this fit in here?"

"Put the planet in the place of the python," said Crandall, "and substitute the human race for the man looking at the snake. You're part of the brain, and I'm part of the reflex arc. Now you tell me not to send the impulse to jump. What you say to me is: 'Don't do your job. *This* python isn't dangerous.' Just how do you expect me to react?"

Buzzel bit his lip, looked down at the table, and frowned.

"You see," said Crandall, "the irritation of jumping when you don't need to is the price you pay for moving fast when it's jump or die. Anyone who succeeds in changing Sections 67 and 68 saves a good deal of friction and irritation. And when the right situation turns up, humanity will stand there thinking things over



till the python gets a good grip and starts snapping ribs."

Buzzel took a deep breath and looked up. In a low voice, he said, "The planet has been thoroughly researched." He added, "There's no danger there."

"So be it," said Crandall. "But I am going to do my job."

Buzzel frowned, and stared at the opposite wall. "Yes," he said, "and I have to do mine." He shook himself and pushed back his chair. Conversationally, he added, "There's no danger in this."

There was a moment's silence as Crandall frowned, studying Buzzel's reactions, and wondering why Buzzel said over and over, "There's no danger. There's no danger here."

The moment stretched out into a long silence while neither man moved.

The ship jumped like a can hit by

an iron bat. The metal walls rang like the sides of a bell.

Table and chairs jolted with a snap of bolts and slid.

Crandall and Buzzel flew sidewise, grabbed wildly for support, and slammed half-bent on the steel deck.

Violent acceleration piled them in a corner. Sharp deceleration slid them to the other end of the room. Crandall feuded off a chair. The table tipped over and landed on Buzzel. The door opened and a ship's officer glanced in. "You all right, sir?"

Buzzel heaved the table off his chest. Crandall shoved the chair back, got up, and helped Buzzel to his feet. Buzzel looked at the ship's officer, who slowly congealed into a posture of attention. Crandall watched approvingly as Buzzel spat out words like bullets out of a gun:

"What was that?"

"S-Sir, one of those things swung an arm around and—"

"One of what things?"

"One of those . . . one of . . . One of those suits, sir."

"It did *what?*"

"Swung an arm around and hit the ship under a drive tube. It— The suit's letting itself loose from the others right now, sir."

Buzzel looked as if he'd been hit over the head with a club. "That's preposterous. It couldn't—" He cut himself off.

Crandall said, "Where's the viewscreen?"

The ship's officer tore his gaze from Buzzel, stared dully at Crandall, stiffened, and said: "Just down here, sir."

Crandall and Buzzel followed the officer down a corridor and through a doorway.

On the screen, one of the shiny boxcars was moving in the center of a mass of writhing snaky limbs. The limbs untangled themselves from the others, the big gray crate above the boxcar drew its cables tight, and the whole thing started to pull loose from the rest. It was moving in toward Cygnes VI.

Buzzel said, "That can't—" He whirled toward the ship's officer. "Get in touch with Base. Have them make a roll call of suit operators." He glanced at the screen. The huge boxcar was gathering headway. Buzzel bit his lip. "No. Don't. Too slow." He glanced around. His hands opened and closed.

Crandall said, "Is that suit equipped with a radio?"

"Yes. The operators can talk to each other. But not on any of our wave lengths."

Crandall glanced at the suit, then at the ship's officer. "Can you get in touch with my pilot?"

"Yes, sir."

Crandall turned to Buzzel. "Am I right? Does this mean something a lot worse than the theft of a suit?"

"I don't know," said Buzzel. "If it's that, it's bad enough. They cost half-a-billion apiece. But—" Buzzel hesitated. "Yes. It could mean something a lot worse."

The ship's officer handed Crandall

a headset. Crandall heard his pilot say, "Sir? Hello?"

Crandall said, "Do you see that floating tangle of boxes and cables? Do you see that one that just cut itself loose?"

"Yes, sir."

"Swoop in front of it once or twice, and try to signal it to stop. If it doesn't, fire a light missile so it strikes the front of that gray crate that's doing the pulling." Crandall covered the microphone and turned to Buzzel. "Or is that too dangerous?"

"No," said Buzzel in a dreary voice. "It'll wreck twenty million dollars worth of equipment, but— No, I'm right with you."

On the screen, the scout spacer dove in front of the delGrange suit. The suit swung in a fast arc—arms, cables, and conveyer belt flailing out behind—and dove on the spacer. The spacer swung back in a tight fast loop and hung in place behind the suit.

The pilot's voice spoke in the earphones. "Releasing missile."

The delGrange suit swerved, climbed, and streaked for Cygnes VI. A thin bright line curved around its side and came back. There was a flash of white light. The suit raced on at constant speed, the wreckage of the crate drifting back to tangle the boxcar.

Crandall glanced at Buzzel. "Was that crate the only source of power?"

Buzzel hesitated, "No," he said, "there's an internal source for the limbs and the conveyor. But there's no other drive."

Crandall glanced back at the screen and roughly guessed the suit's speed and course. He turned to the ship's officer and asked him to work out a more exact estimate, then he snapped on the communications screen.

The pilot's voice spoke in Crandall's ear. "Sir, I could swing in and try to get a tow cable on that thing."

"No," said Crandall, "just keep it in sight."

Crandall got the cruiser *Vengeance* on the communications screen.

"Is *Monitor* on station near VI?"

"Yes, sir."

"I want you to put her on an interception course." Crandall turned to the ship's officer, who read off estimated course and speed of the delGrange suit. Crandall glanced back at the communications screen. "Can you do it?"

"Yes, sir. *Monitor's* near at hand."

"How long will it take?"

"About an hour, sir."

"Fine," said Crandall. "Thank you." He snapped off the screen, and glanced at Buzzel.

"Maybe we should talk things over again."

Crandall and Buzzel stared at each other across the table in the little conference room.

Buzzel said, "Maybe we're going to get cracked ribs here after all."

"What's happened?"

"There are just two alternatives. Either that suit flew off by itself, in which case we've got the chance of a terrific mess, or else one of the suit operators stole it. And that opens up possibilities almost as bad."

"Why?"

"The operators are picked for certain outstanding traits. Intelligence isn't the most important of these, but the operators can't be fools, either. The suits are worth, roughly, half-a-billion apiece. But to try to steal one for money, a man would need the mentality of a cretin."

Crandall nodded.

"All right," said Buzzel. "Grant that the operator has the sense to see he'll never get out away from Cygnes without being spotted and stopped. Why *else* should he try to get away with a suit?"

Crandall scowled, and Buzzel fidgeted. Crandall said, "My purpose in coming out here was to examine one of those suits. Now there isn't time. Have *you* looked one of them over yet?"

Buzzel said, "I operated one this morning."

"What was it like?"

"You put on a sort of tight, close-fitting skin, go in through an air lock, and lie down in a special form-fitting seat. A capsule comes down over the seat. A very soft cap fits over your nose and mouth, and fine needles pierce your arteries and veins. The capsule fills with a warm liquid, and oxygen comes through a hose to the cap at your mouth. A nutrient solution and certain drugs pass in through the needles." Buzzel shivered. "Bodily activity drops to a minimum. The operator floats in this soft, close capsule. Through a series of highly sensitive mutual inductances, information—in the form of sensation concerning the position of the limbs of the delGrange suit—is relayed to his brain. This principle is carried through elaborately. If someone applies light pressure, or a mild corrosive, to the exterior skin of the suit, it feels like an itching sensation. More pressure gives the effect of a pinch. Strong pressures or corrosion produces severe pain. The operator loses awareness of his body. He comes to sense *the delGrange suit* as his body."

Buzzel added, "The trouble is, one of the most important qualifications for an operator is his ability to identify with the machine he operates. Some people are fascinated by machines. Ground cars, airplanes, spacers—away back in history they rode horses as if they and the horse were one. Put a splendid horse out in the yard and tell one of these people he can't touch it—"

Crandall nodded thoughtfully.

"Always in the past," said Buzzel, "we've had trouble with operator fatigue. Sooner or later it disrupts the identification. But delGrange is a perfectionist." Buzzel moodily studied his fingernails. "What we seem to have here is the maximum of identification with the minimum of operator fatigue. The cyberneticists spotted it this morning, and they and Paley had a small war over it. I stuck with Paley. So did the rest of Administration."

"But," said Crandall, "now that

an operator has come and tried to make off with one of the suits—"

Buzzel nodded drearily. "Maybe the cyberneticists had something."

Crandall sat back.

Buzzel said, "Picture what may come about thirty days from now. All that time the operators' identification with the suits will be increasing. Suit failure is practically nil. Then, all of a sudden, they're supposed to come up, and get out of the suits." Buzzel put the fingernails of one hand in his mouth and bit down.

"How long," said Crandall, "can they last if they don't come up?"

"Fifty days at most. That is, fifty days, all told."

"Twenty days more after the thirty are up?"

"At best. The suits ought to be restocked every thirty days." Buzzel took a deep breath. "There could be," he said, "a hundred and fifty billion dollars worth of equipment sitting around down there two months from now with dead men inside of it." He pulled out a handkerchief and wiped his forehead.

Crandall looked up at the ceiling. "Whoever happens to be in charge of Planetary Development here when that happens will get strung up by the heels, I imagine?"

Buzzel said, "The publicity could be terrible." He looked around uneasily. "There would have to be a scapegoat."

Crandall felt his mouth start to bend up cheerfully at the corners, and blanked his face. He glanced at his watch. "You'd better tell me in detail what one of those mechanical suits can do. Then we'd better get back to the control room."

The *Monitor,* a black spherical mass at the center of a giant spoked wheel, swung up onto the screen from below. Six squat tugs were spaced around the rim of the huge wheel, faced against the direction of motion, their rockets blazing as they struggled to brake the massive ship.

Crandall spoke to the *Monitor's* commanding officer. "Do you see that thing like a big steel box with a shallow glass cup on one end?"

"Yes, sir."

"As you can see, it is going to fall into an orbit around Cygnes VI, dip in closer, and burn up in the atmosphere. We have to stop it."

"Yes, sir."

"Unfortunately," said Crandall, "it's equipped with drills, breakers, pile drivers, power crushers, and similar equipment, either recessed in the body of the thing or at the tips of those arms attached to it."

The eyes of *Monitor's* commanding officer narrowed to slits as he glanced aside at his own viewscreen. "Any guns on the thing?"

Crandall glanced at Buzzel, then back at the officer. "No. But if it got close enough to drill a hole in your hull, it could pack it with atomite and set it off, all in about three-tenths of a second. I imagine that would be just as good."

The officer glanced from his own viewscreen back to Crandall. "Sir, you let me yank a few of those arms out by the roots and we'll have an easier time of it."

Crandall turned to Buzzel, who looked pale and sick. Buzzel made half-a-dozen objections before Crandall could cut him off. "No good," said Crandall, glancing back to the officer. "You might let the air out. That could kill the operator."

"Sir, if he won't obey orders—"

"We want some information he's got."

"Oh. Well— Suppose I can snap off a few of those arms about halfway down? The tools are in the ends, aren't they?"

Crandall looked at Buzzel. Buzzel gave a weak nod.

"If you can do it," said Crandall. "But the main idea is to see to it that that thing doesn't go on down toward VI. And we want the operator alive, if possible."

"Yes, sir."

"If you can disable it so we can get in and get the operator out, so much the better. But the main point is—keep it away from VI. And look out for it. It may move faster than you expect once it gets hold of something."

The officer's lips drew back, showing large white teeth. "Don't worry, sir. We'll take care of it." He saluted and stepped out of range of the communications screen. Crandall switched his gaze to the viewscreen showing the delGrange suit and the *Monitor* swinging up from below.

A muffled volley of orders came from the direction of the communications screen. Two of the six tugs spaced around the rim of *Monitor's* drive wheel detached themselves and darted away. The other four moved to again space themselves evenly around the rim. The *Monitor* slowly swung toward the delGrange suit. The suit reached out with several of its long flexible arms and cut loose the cables holding the wreckage of its propulsion unit.

From overhead, a tug drifted down trailing a long cable.

The suit put out a long flexible arm and spun it rapidly clockwise. The suit itself slowly turned counterclockwise, bringing the jointed, saw-edged arm around toward the passing cable, and yanked it in. Snakelike flexible arms reached out, gripped the cable and hauled back hard. The suit ran up the cable like a spider up its thread.

A roar of oaths and orders burst from the communicator. The tug hauling the cable cut loose and dove in a blaze of rockets. The suit arrived at the end of the cable holding out a set of jointed toothy jaws like scrapers on a power shovel. From overhead, the other tug dove, and clamped on to the opposite end of the line. The suit switched holds and went flailing up the line toward the second tug.

Buzzel suddenly sucked in his breath, whacked the keys on the frequency control, and grabbed for the microphone. Crandall jerked his gaze from the suit, and saw the documentary ship jockeying around in the background for a better view.

Crandall leaned forward, reached out as if to steady himself, and put his hand squarely on the frequency control, changing the setting. Buzzel grabbed Crandall's hand, reset the control, and began barking orders into the microphone. Crandall made another grab in the air as if to recover his balance, then straightened, relaxed, and saw tug number two hastily let go the line as the latest model delGrange suit arrived at the end poising a big oversized drill.

Buzzel's voice, snapping orders for the dock-you ship, came to Crandall's ears, and Crandall switched his attention rapidly back and forth noting both the frenzied stream of Buzzel's orders and the delGrange suit, now hurtling down the line toward tug number one, which had again taken hold the opposite end of the line.

In the background, the front end of the dock-you ship lit up in a brilliant display of flashing lights, which, Crandall hoped, signified that a large footage of documentary film was now being taken. Crandall permitted himself the luxury of visualizing for a moment a dim room packed with cabinet officers, members of Congress, sedately-smiling Space Force officers, and Planetary Development officials with bottles of sedative sticking out their pockets. On a large screen at the front of the room was the projected legend:

HALF-BILLION DOLLAR
PDA MACHINE
GOES WILD
OFF CYGNES VI

Buzzel abruptly cut himself off. In a bewildered voice, he said, "They're taking them *anyway*—" He sucked in his breath. Crandall, out of the corner of his eye, saw Buzzel give a light yank on the microphone cord. The already unplugged end jumped out from between some switches and fell on the floor.

On the screen, the delGrange suit was now scrambling wildly up the cable, brandishing drills, claws, and jackhammers. On *Monitor,* a squat black cylinder was rising up out of the central sphere. In the background, getting it all down on film, the dock-you ship flashed its lights.

Buzzel made a strangling sound. Crandall whirled. "Something wrong?"

"You . . . You—" Buzzel grabbed the plug. Crandall lost his balance again, hit the frequency control, then said, "Look on the screen!"

The suit, a long thin extension wrapped around a ringbolt on one of the tugs, clung and hauled itself in as the tug put on rapid bursts of power to break free. A second long extension reached out and gripped the tug. The tug went into a fast dive, then swung up and around with the suit pulling steadily nearer and easing its drill closer and closer to the ship.

Crandall and Buzzel looked on, speechless.

In the background, the dock-you ship moved around to get a better angle.

From the direction of the *Monitor* burst tiny streaks of light. The second tug swung down near the first, and the two straightened into a flat run past *Monitor;* the suit got its drill near the tug, and hitched itself closer. The drill slid ahead once again.

The tiny streaks of light swung down fast into the tangle of suit and tug. The suit jerked, spun around, hauled toward the tug, broke loose, and floated in free space, two of the flexible limbs dangling from their attachments, the rest wrapped tightly around the upper part of the suit.

A third tug joined the other two, trailing a three-cornered cargo net. The tugs clamped the net, dove on the suit, and caught it in the center. One of the tugs folded a corner of the net around the suit, swung up from below, clamped that corner to the opposite side of the net, and let go. The suit sprawled loosely inside the net, as motionless and inactive as a cargo crate being transshipped in space. Various limbs and power tools trailed out through the net to the rear.

Crandall watched the suit closely, then turned to Buzzel.

Buzzel was staring at the screen, the microphone dangling forgotten at his side. He blinked, took a slow breath, and looked at Crandall. "Shock," he said. "The operator's in a state of shock. He's got the equivalent of two broken arms." Buzzel looked back at the screen. "Well, now we can get him out of there and—"

The documentary ship swung around for a long-distance shot of the two tugs carrying off the inert latest model delGrange suit. Buzzel let out an angry growl, lunged forward with the wire and plug, and roared orders into the microphone.

An alien hiss and cackle burst from the speaker. Buzzel blinked his eyes rapidly. Crandall leaned forward and stared at the frequency setting.

"Sir," said the voice of the *Monitor's* commanding officer, "we've got the thing. Now what do we do with it?"

Crandall glanced around. "Just have those two tugs stand by with it." He turned to Buzzel. "Is there some reason you want that ship with the lights taken out of there?"

Buzzel was looking at Crandall the way a hungry soldier looks at a ration that has bits of rock in it. "Yes," Buzzel said. "Yes, I do want it taken out of there. I want it taken out of there and I want the film impounded. And now if you'll kindly let go the microphone cord, and keep your hands off the frequency setting, I will order just exactly that."

"No trouble at all," said Crandall courteously. He turned to the *Monitor's* officer on the screen. "Take that documentary ship into custody. Get it out of here and down to Space Force H. Q. Impound the film. But take good care of it. Don't damage it. And treat all the personnel with proper courtesy."

The officer gave a wolfish grin. "Yes, sir." He turned away and barked out orders.

Crandall thought it well to leave the Planetary Development ship shortly afterward.

The two days of the arrival and descent to Cygnes VI of the del-Grange suits and their operators had seemed to Crandall as long as several ordinary weeks. The following few weeks seemed to take years in passing, as the avalanche of criticism got past the Chief of Staff on Terra and broke on Crandall's head.

At the same time that violent demands were being forwarded from all branches of the government, Crandall had to deal with innumerable petty crises caused by the daily routines of martial law. Through this, Crandall clung grimly to the awareness that two hundred and eighty-six men would die if they did not leave their suits on schedule. A parade of specialists passed through Crandall's office to testify to this and other facts. Where the facts were concerned, the specialists generally agreed unanimously. Where interpretation and prediction based on the facts were concerned, the specialists generally disagreed unanimously.

The trouble, Crandall told himself, was that this had never happened before, so no one knew how to weigh the factors involved. Once it had happened, it would all be explained, and everything would be obvious. Right now it was another matter, and no-one knew how it would turn out.

One of the most certain on this matter of not knowing was Buzzel, who formally requested Crandall to release Paley. Buzzel insisted that he, himself, was not fitted to handle the job. Paley's superior intellect, his swift reactions, his long experience and meritorious service—all argued that he, not Buzzel, should have the opportunity of dealing with the situation.

Crandall was inclined to agree. He had Paley brought up for an interview, while a phalanx of guards waited outside the door. As Crandall had told Buzzel, it all depended on whether or not Paley would co-operate. Noting Paley's expression, Crandall thought that the prospects were not inviting.

"Well," said Paley, "do I stand at attention? Should I salute? What happens next? Where am I, anyway?"

"From your point of view," said Crandall, "you're back in the Day of the Warrior. The fossil has you in its jaws."

Paley colored. "What do you want?"

Crandall described what had happened to the suit. Paley sneered and implied that Crandall had handled it all wrong. Crandall mentioned that the operator afterward had failed to remember anything that happened while he was in the suit. Paley said, "Protective amnesia," and looked condescending. Crandall suggested that they might possibly be dealing with unknown factors and ought to prepare for unpleasant possibilities. Paley remarked that Crandall was out of his province. Crandall said that he would either go a step further and take direct control of Planetary Development, or a step back and return control to Paley. Paley said that, in the first case, Crandall would find himself out of his depth.

"All right," said Crandall, "what if you're reinstated?"

"Reinstate me," said Paley, "and I will block you every step of the way."

Crandall flipped on the intercom.

"Sir?"

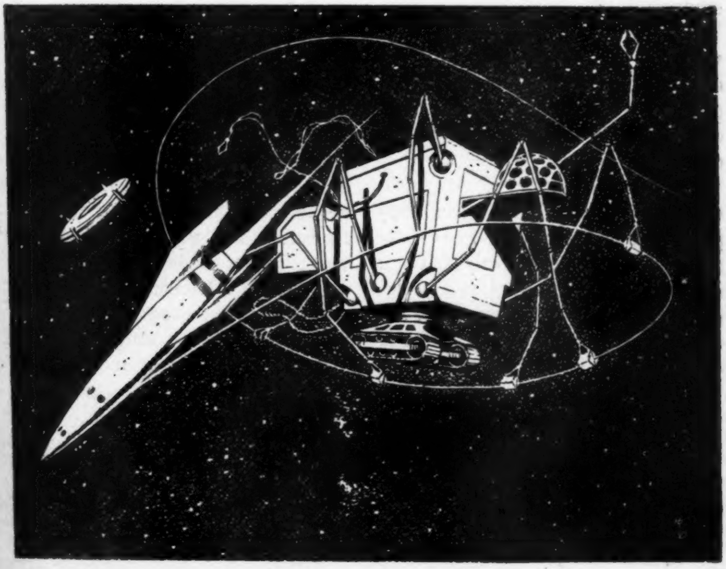
"Start canvassing Special Services for a volunteer executioner," said Crandall. "Also have Special Services form a grave-digger attachment."

"Yes, sir."

Crandall switched off the intercom.

Paley stiffened and blinked. "You can't bluff me."

Crandall said, "You're a good judge of human nature, aren't you, Paley? You know the operators in those suits are going to come up right on schedule. You know the cyberneticists in your own organization are wrong. You know I'm wrong. You know the men who framed Sections 67 and 68 are wrong. Everyone's wrong but you. You've got ability and we badly need it, but why use it? You know you're right without bothering. You let mannerisms, trivialities, and special cases irritate you so much you won't see what's underneath as the principle of the thing. You've got all the answers beforehand. All right, so be it. You won't believe you're going to die till the



trapdoor gives way under you." Crandall flipped on the intercom. "Send in the guards."

The door opened. The guards marched in, their boots striking the floor in unison. They halted with a united click of their heels. The bayonets at their sides clinked and rattled.

Paley was standing perfectly still with a glassy look on his face.

Crandall glanced at the sergeant. "Take him out."

They marched Paley out of the room, and the tramp of feet moved off in the corridor.

Crandall reached for a paper on his desk.

There was a commotion outside.

Crandall got up and opened the dor. Paley was struggling with his guards. He saw Crandall.

"All right," he cried. "I'll do it—I'll do it."

On Paley's promise to wholeheartedly co-operate, Crandall reinstated him. But before Paley returned to Planetary Development H. Q., Crandall let him sit in at the first run of a nicely-detailed film titled:

HALF-BILLION DOLLAR
PDA MACHINE
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OFF CYGNES VI

Paley went away greenish and shaken.

After Paley's return, Planetary Development began to show increased activity. Permission was requested, and granted, for extensive tests with some of the twenty-four reserve suits. Friction between Paley's men and Crandall's fell away toward normal, and all indications showed a steady rise in P. D. A. morale.

Crandall put in all the thought on the underlying problem that he could. As a result, he sent a series of code messages to G. H. Q., Space Forces, Earth. And he carried out a number of preparations on his own.

A week before the delGrange suits and operators were supposed to come up, Paley came to see him. Paley looked as if he had spent the last few nights staring at the ceiling.

"Matt," said Paley, "this is hopeless. On the basis of the tests I've made, those operators aren't going to come out."

"You said delGrange tested the suits personally, beforehand?"

"That's exactly the trouble. I didn't see it before, but now it's obvious. DelGrange knew so much about those suits, inside and out, that his reactions just weren't the same as the operators' reactions will be. DelGrange *knew,* mentally. The operator *senses,* physically. If delGrange had a blackness and numbness at getting out of the suit, his mind promptly interpreted it as a mere loss of induced sensation from the exterior receptors of the suit. If there was the remote beginning of a sort of terror, his mind could dismiss it as irrational before he was really aware of it. That isn't true of the operator. It isn't true after five hours in the suit. I've tried it myself. There's a blackness that comes over you—a numbness and a dizziness. It builds up. It's like a kind of death to come out of one of those suits. You get terrified. You struggle to get back. That's how it hit me after five hours. How's it going to hit the operators after thirty days?"

Crandall nodded thoughtfully. "Can you service the suits *without* the operators coming out?"

"No, you have to get into the operator's compartment.

"Through the air lock?"

"That's the only way I know."

"Is there any way to force an entrance?"

"Maybe, if all the limbs and devices were smashed. But the suit feels pain. That is, the operator feels damage to the suit as pain. If we try to force an entrance, we'll be in about the same spot as the man who goes into the bear cage at the zoo with a pair of pliers and no anaesthetic. Maybe the bear really *wants* that bad tooth out, but—"

"Yeah," said Crandall. "Wait till the pain hits him. Well— All right, we've got two problems. First, they have to come up here. Is that right?"

"Yes," said Paley. "If they don't do that, we can't get them out. The pressure on VI would kill them. To say nothing of what we'd have to go through even to get down there."

"All right," said Crandall, "first they have to come up. Then, second, we have to get them out of the suits. And from what we've seen, they won't *willingly* come out of the suits. If we try to force them, they'll fight. If they fight, the only way to stop them will be to smash their limbs. And then the suits will be ruined.

"Yes," said Paley, "and the operators in a state of shock. Two-hundred and seventy-six of them." For an instant, Paley's eyes shut and his face twisted. He sucked in a deep breath and let it out slowly. "Well," he said, "we've got alternate operators coming. That isn't the worst of it. But it's going to take time to repair or replace those suits. VI was scheduled for heavy ore production. With the suits out of action, it will unhinge the whole schedule. Then there'll be all kinds of repercussions once the schedule goes. And that, *still,* isn't the worst that might happen. The operators might come up and—"

"I know," said Crandall.

Paley looked at him dully. "All because the suits were *too perfect.*"

Crandall opened a desk drawer and pulled out a sheaf of papers. "I think there's one way out of this hole," he said, *if* we can act fast and co-operate with each other."

Paley shuddered and said, "I think we can co-operate with each other."

Crandall put the sheaf of papers face up on the desk and began to talk.

Paley listened earnestly.

On the day the delGrange suits were due to come up, Crandall and Paley stood near each other on the cruiser *Vengeance.* Each man had his own viewscreen, his own communications screen, and his own battery of microphones. A glance at the wide-angled viewscreen showed Crandall the dark bulk of the *Monitor,* and a cloud of small scout spacers far overhead. A number of huge Planetary Development nurse ships waited in the foreground, while, far to one side, the documentary ship moved from place to place, trying for a better view.

Crandall glanced at his watch, and Paley said, "I don't think they're coming up."

The dock-you ship flashed its lights. Crandall leaned forward. On the screen, a speck appeared, swooping up from Cygnes VI. Other specks came rushing up behind it. The specks grew rapidly, and Paley leaned toward a microphone. In a relieved voice, he said:

"Welcome back, men. Leave your ore-carriers up here to be reloaded. Proceed immediately to the nurse ships for deactivation, servicing, and replacement."

No answer came from the receiver.

Paley scowled. "Welcome back, men—" He repeated his instructions.

The receiver remained silent. On the screen, the specks grew rapidly larger and began to take form. Paley signaled a technician to check the communicator.

Paley repeated, "Welcome back, men. Leave your ore-carriers up here to be reloaded. Proceed immediately to the nurse-ships for deactivation, servicing, and replacement—"

There was still no answer.

Paley glared at the technician, gave the receiver a whack on the side, and again repeated, "Welcome back—"

A flat toneless voice replied, "All humans out of the nurse-ships."

Paley blinked. "Leave your ore-carriers—"

"No ore."

"Men—"

"We're going into the nurse-ships two at a time. Any humans in the nurse-ships get killed."

"Listen to me," said Paley. "Your suits have to be serviced. Otherwise you won't last another thirty days."

"We'll service ourselves."

"How?"

"How is none of your business. We're doing it. Now get out of the way or get hurt."

"Listen," said Paley, "I understand. It's not an easy matter to leave those suits. But the ore *has* to be brought up, and then you have to leave the suits. Nothing bad is going to happen to you. It just has to be done. You signed for this job. You've been trained for it. Now you have to carry it out."

"No," said the voice, in a faintly pitying tone, "we didn't sign for this job. We didn't know what it was going to be like. We weren't told till it was too late to do anything about it. We trained in Model C's. They aren't anything like these suits, so we weren't trained for the job, either. Now *you* are going to tell *us* what to do?"

"Earth," said Paley tiredly, "has to have the ore."

"O.K. It's down there ready to load. But *you'll* do things *our* way. We're going in the nurse-ships and service each other. When enough of us are ready, we'll get the ore—if there's time. If you don't like it that way, that's tough."

Paley said, in a dispirited voice, "Give me a few minutes to think it over."

"We'll give you nothing. If the nurse-ships don't open up when we get to them, we'll knock a hole in the side. If you want to do it some other way, forget it. This is the way it's going to be."

Paley snapped off his microphone and turned to Crandall. "The only way I know that they can service each other without leaving the suits is to first cut the nerve cable that supplies the front outer wall of the suits. Then they have to cut out a section of wall and reach through from outside. I don't see how they can repair the cable. That means that future injuries in that part of the suit are likely to go unnoticed. And if they don't put the section of wall back with a very strong tight join, the pressure down there will either make a leak, or else shove the whole section in. Worse yet, I don't think they have either the knowledge or the equipment to do a good job of servicing. If they'd listen, I think I could convince them. But meanwhile, time's passing. We have only so long to get the ore up, the suits serviced, and new operators down there." Paley shook his head. "Maybe your plan will work."

Crandall flipped on one of his bank of microphones. He cleared his throat with a rasping sound. "Attention. This is the Commanding Officer, Space Force, Cygnes. Martial law has been established throughout Cygnes System. Failure of any delGrange suit operator to obey instructions of authorized personnel may be regarded as mutiny."

There was a moment's silence and then, as Crandall had expected, a stream of obscenities came out of the communicator.

Crandall snapped off the microphone, looked at the viewscreen and noted that all the suits seemed to have come up from Cygnes VI. They were bunched, those in back having put on more speed to catch up, and those in front having slowed to change direction.

Crandall glanced at the communications screen. "*Monitor* only, open fire."

Tiny streaks of flame curved away from the massive sphere in its wheel, raced in and out amongst the suits and exploded nearby in brilliant flashes of light.

Incoherent shouts came from the communicator. One voice dominated the rest, and the suits began to move toward *Monitor*. Further bunching now took place, as the suits nearest *Monitor* hung back, while those far away advanced bravely. *Monitor* hurried the process by exploding missiles in front of the nearest suits and behind the farthest.

Crandall, watching intently, said, "Scout spacers. First Flight only. Ready. Dump your cargo! Second flight, stand by."

Scout spacers dove toward the delGrange suits.

"Second Flight only. Ready. Dump your cargo! Third flight, stand by. First flight, reload."

Mingled shouts and curses came from the communicator. On the screen, the suits writhed, twisted, and began to mill about, losing their momentum toward *Monitor.* Over the howling confusion, one voice rose loud and clear:

"Move! Spread out! Keep moving toward *Monitor*!"

Crandall studied the suits and turned to Paley. "O.K. Now."

Paley shouted into a microphone.

Twenty-three delGrange suits—the reserve that hadn't dropped to Cygnes, came out from behind the *Monitor,* spread out, and raced toward the other suits, which were now twisting, writhing, and milling about, their flexible arms scrubbing their sides, their jointed, steel-toothed extensions sawing jerkily across their backs.

"Third flight," said Crandall, "practice dive only. Practice dive. Ready—"

The new delGrange suits raced in among the rest, and new sounds burst amongst the screamed and muttered curses:

"Look out! Here they come again!"

"Run for it!"

"LOOK OUT! HELP!"

"To the nurse-ships!"

"Quick! *To the nurse-ships!*"

These new shouts drowned out a stream of insistent orders and pleadings to *"Keep moving toward Monitor!"* The whole mass began to move in the opposite direction, save for one gesticulating knot of cables that waved and pointed furiously toward *Monitor,* found itself isolated, dropped back and gripped another, then another, succeeded in getting three or four headed back toward *Monitor,* and then received special attention as Crandall sent scout spacers to dump cargo on the hindmost delGrange suits.

The retreat from *Monitor* turned into a wild rush toward the nurse-ships.

Paley gripped his microphone. "Attention! Proceed in an orderly manner to the nurse-ships for decontamination. Attention! Proceed in an *orderly manner* to the nurse-ships!"

A wild yell burst from the communicator. "Let me out of this suit!"

"Slow down!" roared Paley. "No crowding! There's room for everyone. Don't leave your suits till you're *inside the ships!* Retract those drills! Don't use them on the suits! SLOW DOWN!"

The screen was a spidery nightmare. The delGrange suits rushed headlong into the giant maw of nurse-ship number one, flowed around it and vanished into others. The big doors closed.

Crandall and Paley looked at each other and smiled feebly.

Crandall was massaging his throat several weeks later, following a visit of high government officials, when the lieutenant reported his presence.

"Sir," said the lieutenant, handing Crandall a stamped slip of paper with an official seal, "I've been told that you must have made this payment."

Crandall took the paper and saw:

Rec'd Payment
1 pipet, 25ml., smashed $2.75
O.K. P. D. A.

"Hm-m-m," said Crandall. "Well— That's taken care of."

"Thank you very much, sir."

"You're welcome, lieutenant."

"And now, sir—" The lieutenant handed Crandall a small, neatly wrapped package. Crandall, frowning, took it. The package, though small, felt heavy. A card on the outside read:

"To Col. Matthew Crandall, from the officers and men of his command, Cygnes System."

"Well," said Crandall, groping mentally. "Hm-m-m. I certainly appreciate this—"

"I'll tell the men, sir. Ah, sir, may I ask a question?"

"Certainly."

"What was that stuff in bottles and sprayers that we dumped on the suits?"

"Acid," said Crandall, smiling. "The suit operators felt mild corrosion of the suit's outer skin as an itch. The acid gave a sensation like poison ivy on a huge scale. The operators left their suits, the acid was neutralized, an inductive device we'd worked out was installed, and next time we hope to get a better result with less trouble. Keep your eyes open. There'll be a White Paper out on the whole thing pretty soon."

"Yes, sir," said the lieutenant.

Crandall glanced curiously at the package. "Ah— Would you express my thanks for this gift, lieutenant?"

"Certainly, sir."

The lieutenant and Crandall exchanged salutes. The lieutenant about-faced and left the room.

Crandall relaxed in his chair. He turned the package over thoughtfully in his hand.

"Hm-m-m," he said.

He took the card off carefully, untied the ribbon, and folded back the paper. Highly-polished silver flashed in the light of the room.

Crandall squinted, then started to grin.

He got up, opened the door, and glanced out in the corridor to see whether anyone was still around outside.

He walked back into the room and laughed.

He turned the gift in his hands, and saw the word "STERLING." A massive silver bolt joined the two halves unbreakably together.

Crandall set the gift prominently in the center of his desk and got back to work.

The first Space Force officer in history to own a massive, finely-detailed, solid silver pair of pliers.

**THE END**

# LIVING FOSSILS IN PRINT

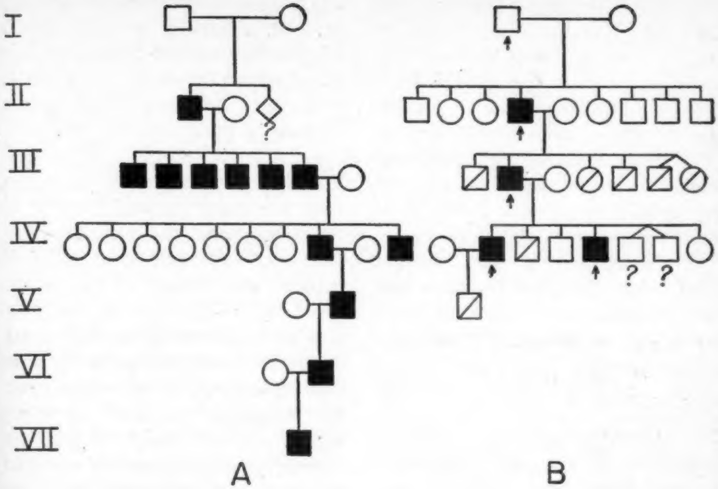
## BY WILLIAM C. BOYD

***If you copy the published work of one man, it's called plagiarism. If you copy the work of several men, it's called research. And if the several all copied from one source that was wrong...it makes a very learned and well-established well-researched error indeed!***

MODERN science is a wonderful structure, the pride of Western Civilization, and one of the supreme achievements of mankind. Daily anxious statesmen tell us of the urgent need for more science and scientists, for it seems that science is no longer just something the longhairs do in their ivory towers—whatever an ivory tower is—but is the principal agency on which we rely to ensure our very survival as a nation.

The foundation of this great structure is facts, and the textbooks of science are full of facts. This is not open to doubt, of course. However, and this is something not so well known, the textbooks also contain considerable numbers of non-facts.

Before we try to account for this deplorable state of affairs, let us consider a few examples. For instance, what is the percentage of iron in hemoglobin, the red coloring material of our blood? A few years ago I had occasion to look this important datum up in a textbook of biochemistry. The figure I found was 0.0335. Now, as any chemist knows, from the percentage of an uncommon element in a large molecule, one may compute the minimum molecular weight of the molecule, for it is clear that the molecule can't contain less than one atom of the uncommon element per molecule—hemoglobin, as it happens, contains four iron atoms. If the number of atoms of the element per molecule is known, multiplying the minimum molecular weight by this number—four in our case—gives the correct molecular weight, which for hemoglobin is known from ultracen-



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trifugal and other measurements to be about 68,000. It was my intention, on this inauspicious day, to illustrate this useful principle in the lecture which I was going to give, in about half an hour, to our class in medical biochemistry.

I wrote down the usual formula. Doing the division on my trusty slide rule, I found the answer to be 167, and it was then only a question of decimal point. Finding that in the usual way, I obtained 167,000, so the correct molecular weight would be four times this, or 668,000 . . . How's that? This is nearly ten times the right value! Well, perhaps I slipped a decimal point in doing the calculation. One often does. So I did it again. Same result. Well, one often makes the same mistake over and over and is unable to find it, so I was about to give up, when a revolutionary thought crept into my mind. Could the figure in the textbook be wrong? It was a very good textbook, but still— That was easy to check. I looked in another textbook. "Percentage of iron in hemoglobin 0.0335." That settled it. I was making some stupid error in decimal point. My time was up, so I went off and gave my lecture, telling my class the principle of estimating minimum molecular weights, but not attempting to illustrate it.

The lecture finished, I did the calculation again. The result was still ten times too high. Could it be that . . .

No, no, impossible! However, the seed of doubt had been planted. I started looking through other textbooks. The next five gave 0.0335. The sixth gave me a start. "Percentage of iron in hemoglobin, 0.335." That would give the right minimum molecular weight. But it was a minority opinion — so far. I looked in other textbooks.

To make a long story short, I found that somewhat less than half of the books gave 0.335. Most of the books, right or wrong, referred to the original analysis by German investigators. I looked in their paper. The correct result was 0.335.

It was fairly clear what had happened. Some textbook, somewhere back along the line—probably one of the early German books on biochemistry; I never identified it with certainty—contained a typographical error—only one?—an unwanted zero in front of the first 3. Subsequent books copied this error from this book, *and from each other*. Only a few writers had actually looked up the original source of the data; all the other books contained this fossilized error, one which is by no means easy to discover unless you happen to be especially interested in the subject.

Does this mean that the authors of the books which perpetuated the error were incompetent? Not at all—just busy, like the rest of us. It is humanly impossible for a scientific author to go back to the original sources for all the data he crams into his book. Secondary sources, such as other textbooks and reviews, have to be used. Otherwise it would take a lifetime to write one book. The only moral we can draw from this example is that just because a thing appears in print, it ain't necessarily so.

Perhaps biochemists are lazier than other scientists? Let's take a look at human genetics. You doubtless know that man has twenty-four pairs of chromosomes*—that's what all the books say. Well, if you do, you probably know something that isn't so, for the recent counts pretty much agree that we have only twenty-three pairs. The reason for the error? It is not at all easy to count the human chromosomes, and the early work, on which the statements in all the books are based, wasn't as good as we believed. But until recently nobody thought to check it. It said so in the books, didn't it?

If you have read much on genetics, you probably also know that in man—and many other animals—sex is determined by the X and Y chromosomes. If you have 2 X's, you're a female, if you have an X and a Y, you are a male. This happens to be true, if you are content with a rather simplified version of the situation. But you probably also know that although the Y chromosome doesn't contain as many genes as the X, it does contain some genes peculiar to it, especially some producing abnormal and diseased conditions, which of course appear only in males. You do know this? (All the books say it's so.) Well, if you know it, you know another thing that isn't so, or at least have a notion which has very little to substantiate it.

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*The chromosomes are rodlike structures in the nuclei of cells, so-called because they stain deeply with certain dyes. They are thought to contain the units of heredity—genes—arranged in linear fashion something like beads on a string.

One of the most famous examples of Y-chromosome inheritance in man is the family of the famous English "porcupine man," who had a horny skin with prickles on it reminiscent of a porcupine, but who nevertheless managed to acquire a wife and leave descendants, who also carried on the line. The pedigree, which appears in nearly all books on human genetics, seems to make the mode of inheritance quite clear. (Fig. 1A) (The circles represent females, the squares, males, while the lozenges show reported children whose sex is uncertain.)

A year or so ago, Dr. Curt Stern started looking up the original sources on the porcupine man. The true pedigree, as ascertained from the best sources, such as parish registers and contemporary accounts, is given in Fig. 1B. (The arrows indicate the individuals actually seen by the original investigator, showing to what an extent hearsay and secondhand reports had been used in constructing pedigree A. Diagonal lines mean the person was reported to be affected. Question marks indicate no certain knowledge as to whether the individual was affected or not.)

You will see that the pedigree as originally published contained a large number of affected males who were, so far as Dr. Stern could tell, purely imaginary, and omitted two females who in all likelihood were affected. Even one affected female spoils the hypothesis of Y-chromosome inheritance. Another wonderful example of knowing something that isn't so.

Was the original pedigree the work of a moron? Not at all, it was presented by one of the best of the early writers on human genetics. Again, however, it is impossible for an author on human genetics to go back to the original sources in all cases. He has to get much of his material second or third hand. His only protection from error is a critical attitude, and until recently nobody felt critical about Y-inheritance in man. His suspicions once aroused, however, Dr. Stern examined all the other reports. Without exception, they proved to be founded on inadequate or inconclusive evidence, leaving us with no proven example of Y-inheritance in man. One of the fossilized errors has been removed from the data of human genetics, but how many remain? Furthermore, we shall have to wait about a year before textbooks start coming out without this particular error. The mills of science and publishers grind slowly.

So far we have dealt with errors which can be traced mainly to the limited amount of time which any scientific author has at his disposal, plus probably the tendency, strong in all of us, to believe anything we see in print. Print somehow looks so convincing. Now let us consider an example where another motive enters, namely a strong desire to believe that what the books say is so. This motive operates, for example, to perpetuate many of the absurd errors about sex which get printed and reprinted, but we can illustrate it equally well from an entirely different subject, one where you would think emotion would play no role. I refer to *mycology,* the science which treats of mushrooms and other fungi.

You undoubtedly "know," for example, that most mushrooms—or toadstools; there is no difference—are poisonous, and that it is practically suicide to go out into the woods and gather mushrooms to eat. All the books available in this country are unanimous in conveying this impression. In particular, the books unite in warning you against *Russula emetica, Amanita muscaria,* and some of them against *Amanita caesarea.* Some books say further, "Never pick any mushroom which has pores instead of gills, for it will be a member of the great genus *Boletus,* which contains some of our most deadly species."

If you have read these books, you again know something that isn't so. It is true that there are some deadly poisonous mushrooms—a piece of *Amanita phalloides* or *A. verna* the size of an unshelled peanut might possibly kill you—but the number of poisonous species is relatively small, probably not over a dozen out of some thousand or thousands. The number of individual poisonous plants in a patch of woods can be quite large, however, since some of the poisonous species are quite prolific. *Russula emetica* is not poisonous, and not emetic (an emetic induces vomiting); on the contrary it is one of the best edible mushrooms. Raw, it tastes as hot as pepper, and might not be good for you[*]; cooked, it has flavor and texture hardly second to any. I eat it freely every summer. *Boletus* contains some of the best species, and it is by no means certain that *any* Boletus is poisonous.

*Amanita caesarea* was a favorite of the Roman emperors, a highly esteemed luxury—it is not common—but the American books agree in saying, in effect, "EDIBLE BUT EAT NOT." The stated reasons for this advice are various; some books say it is because you might mistake it for the "deadly" *A. muscaria*—which I discuss below—others that it may be that the American species is different from the Italian, and possibly poisonous. None of these are the real underlying reasons, as I mean to show, and the various authors have just been blindly copying older statements whose authority is practically lost in the mists of antiquity.

All of the American books, and most of the European ones, agree that *A. muscaria* is deadly poisonous. The very name seems to suggest "fly-killer," and the Russian common name, *mukhomor,* means literally that. Nearly all the books contain a description of the little circle of dead flies you always see around this mushroom, and some contain a spirited play-by-play account of the flies greedily buzzing up for their last tipple of the fatal juice. In many countries this mushroom, broken up and mixed with sugar and water, is routinely used to kill flies. The active principle, an alkaloid called muscarine, 1/500 milligram of which will stop a frog's heart, has been isolated and its structure determined.

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[*] I have not tried this mushroom raw, although a few recommend it. Raw mushrooms do upset some people; one of my friends became violently and seriously ill after eating—the idea was spontaneous—part of a raw mushroom. The uneaten part was unfortunately discarded before the illness came on, so the species was never positively identified.

One couldn't ask for better or more convincing evidence than that, could one?

Probably not, but it is another of those things that aren't so. *A. muscaria* has never been known to kill a fly —I and others have tested this experimentally—it is never found surrounded by a circle of dead flies, and it probably never killed a human being. I have eaten several grams of it at a time, with absolutely no effect, not even a stomach ache.*

How did such a completely imaginary and erroneous account ever find its way, not merely into one or two, but into virtually all of the hundreds of books which have been published, in various languages, on mushrooms? Well, in the first place, as in other branches of science, few of the writers found time to look up the original sources, so they copied from older books. Once again, there is the tendency to believe what you see in print.

When I first started collecting mushrooms, many years ago, I noticed that there were never any dead flies around an *A. muscaria* plant. I puzzled about this in a muddled sort of way, but finally dropped the matter with a vague feeling that perhaps my observation was faulty. When I began to suspect that *A. caesarea* was not poisonous—it's delicious!—I collected and dried some without trying to eat it. To make sure I knew the difference between *A. caesarea* and *A. muscaria* I also collected and dried some of the latter. Back in my laboratory I fed both to mice, reasoning that if the mice fed *A. muscaria* died and those fed *A. caesarea* lived, I could rely on my identification, whereas if both groups died it would show either that my identification was at fault or that *A. caesarea* is poisonous in this country. The outcome of the experiment was neither of these alternatives. All the mice lived!

You might suppose that I then said triumphantly, "Aha, *A. muscaria* is not poisonous after all." I didn't, however, not being any brighter than hundreds of other scientists. I felt puzzled, and decided to postpone eating any *Amanita* to another summer. After all, mice are not human beings. And all the books warn you.

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*Let it be noted that I do not yet urge the reader to go out and start eating *A. muscaria* in large amounts. It might still prove that it is poisonous in some parts of the country, or when eaten in sufficient quantities. Furthermore, some believe that the American species is different from the European and Asian species (it is lighter in color). Finally, one must allow for the possibility that some persons are hypersensitive—allergic—to certain mushrooms, just as some people are to strawberries. A single aspirin tablet has been known to kill a person allergic to aspirin. And all of the advice in this article presupposes that you can identify your mushroom correctly.

It was not until I was recently sent a book to review for the *American Anthropologist* that I began to see the facts in true perspective. This remarkable book, by V. P. and R. G. Wasson, was published by Pantheon Books in an edition of five hundred copies at one hundred twenty-five dollars a copy. One of the chapters is entitled "The Flies in the Amanita." In this chapter the authors point out that nobody has ever seen *A. muscaria* kill a fly, and they set about finding the real reason for the name. I believe they have succeeded.

One of the high points of their book is an account of their experience with mushrooms that cause visions, which they partook of as part of the rites of certain religious groups among the Indians of Mexico. These mushrooms produce hallucinations of such depth and power that the Wassons believe such experiences may have sparked in early man the idea of the divine or even the idea of God. The Wassons believe that *A. muscaria*—and they present a large amount of purely documentary evidence to this effect, not having tried it themselves—at least in the Old World, has similar intoxicating effects, and is called the fly mushroom because it puts a fly—or bee—in your bonnet. In other words, enough of it makes you roaring drunk and produces hallucinations. The Wassons point out that the idea of insects—bugs—in the head as synonymous with hallucinations or insanity is widespread over the whole world.

The hallucinations produced by the intoxicating mushrooms evoke the strongest emotion, and these mushrooms came to be considered holy. What is holy is often also taboo, and the mushrooms, in most countries, came to be reserved for the earthly representatives of the gods, the priests. The sacred fungi were forbidden to the common man. That is the real, though unconscious, reason, the Wassons think, *A. muscaria* is so sternly warned against. Not because it will kill you, but because it will give you a—forbidden—pipeline to God.

In case any reader doubts that a taboo could have such force at the present day, let him ask himself if he is ready to go to a restaurant and order a nice juicy horse steak. There is nothing wrong with the horse as food; his proteins contain the right amino acids and the flavor is delicious. Some like it better than beef. The reason you are unwilling to eat horsemeat is that the horse was once, in the culture of our early ancestors, a sacred animal, and his flesh was and is taboo. Convinced?

In other words, the reason all the books in English warn you against so many harmless or even delectable mushrooms is that the Anglo-Saxons, and following them the Americans, are *mycophobes*—afraid of mushrooms—because of an early taboo. Writers in English readily believed that *A. muscaria* killed flies and was very poisonous, because they wanted to believe it. The Wassons show by one example after another that writers in English could hardly find words bad enough to apply to mushrooms. (Toadstool is only one of them.)

In Europe *mycophagy*—mushroom eating—is much more advanced than it is in England or the United States, and many species are popular, but the Wassons offer plenty of evidence that these countries also were not so long ago mycophobes. Even the great naturalist Linnaeus, father of the system of naming of plants and animals in use to this day, allowed his native mycophobia to trick him into giving mushrooms a rather slovenly treatment. He seems to have assigned the name *Amanita,* which originally meant the field mushroom, now called *Agaricus campestris,* which is grown and sold commercially in this and other countries, to the genus which includes, among some very good species, the most poisonous plants known, and assigned the name *Boletus,* which referred to the mushroom of the Caesars, to the entirely different genus which has pores underneath instead of gills.

Some early peoples took the opposite course and adored and admired these remarkable mushrooms. These peoples are *mycophiles*—lovers of mushrooms—and include the Russians, the Catalans, the Chinese, the Japanese and perhaps others. In mycophilic countries mushrooms are freely gathered for food, and mushroom poisoning is unknown because nobody would mistake a poisonous mushroom for one that is edible. Mushroom poisoning happens in countries where mycophagy is relatively new and identification not yet one hundred per cent perfect among the common people.

Another of the facts that aren't so involves the question of whether there *are* any hallucinogenic mushrooms. In 1915 Dr. W. E. Safford, an ethnobotanist of wide and deserved reputation, published a paper in which he demonstrated, to his own satisfaction and that of many other scientists, that the reports, from the early Spanish explorers and others, of hallucinogenic mushrooms in ancient Mexico were all based on a confusion of dried mushrooms with dried peyote (*Lophophora williamsii*).

The dried peyote button does look a lot like a dried mushroom, and it does produce visions, so the argument carried weight. Just the same it was another of those pseudo-facts. Hallucinogenic mushrooms of several species belonging to several different genera not only were used, but are still being used, sometimes in places only a few hours by car from Mexico City. It took determined amateurs like the Wassons to bring them to the attention of scientists.

Some readers may have been exclaiming for several paragraphs, "Hold on. Take it easy! What about the toxic alkaloid isolated from *A. muscaria?* Doesn't that show it is poisonous?"

Well, not necessarily. The chemists obtained only 120 milligrams from 25.5 *kilograms* of fresh mushrooms. Let us assume they recovered half of the alkaloid present, which is about par for such an operation. A dose of 0.23 mg. per kilogram of body weight kills half of a group of mice injected with the substance. From this we can calculate that a man would have to eat 1.7 kg. or 3.7 pounds, to have a fifty per cent chance of dying. This seems a lot of mushrooms to eat at one sitting. Even letting myself go on my favorite mushroom, I have never been able to eat more than half a pound. And all this assumes that muscarine is as toxic when taken by mouth as when it is injected intravenously. Experiments on monkeys show that it is not. After all, the finding of a toxic alkaloid in a plant does not show the plant is inedible. Potatoes for example contain the poisonous solanine, but few die from eating potatoes. It is the amount that is important.

It would seem, therefore, that when there is a strong emotional bias in favor of believing something, no matter how poorly backed up this something may be by evidence, scientists, like other people, allow themselves to be easily persuaded. If you are afraid of mushrooms, it doesn't take much evidence to convince you that they are dangerous. You never stop to reflect that the fear may come from an unconscious attitude you imbibed with your mother's milk.

The moral? Well, there really isn't any. Scientists are just human beings like the rest of us. They are all interested in some certain field of science, and within this field they are critical and careful. Nothing delights them more than finding that another worker in the field has gone off the deep end and published something that the evidence won't support. If they were not like this, science would not advance. But outside their field of competence scientists are no different from other people, and are just as disposed to believe what isn't so.

For this reason, science, although true by and large—we hope—is still studded with fossilized errors, like raisins in a cake, that nobody has yet pointed out. The reason scientists are important and valuable today, and the reason the politicians want more of them*, is not that they are so much brighter than the rest of us. It is just they are working at a branch of knowledge, increasing it—usually rather slowly—making mistakes from time to time, it is true, but doing their best.

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*So far, apparently, no member of the government has proposed the one sure-fire way of attracting young people into science, which is simply to pay scientists more.

THE END

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

# THE MAN WHO COUNTS

BY POUL ANDERSON

Illustrated by van Dongen

***Conclusion.** There are times to fight, times to run away, and, as old Van Rijn showed, times to turn the other cheek. And sometimes it's not so easy to spot who is responsible for success or failure....*

of the alkaloid present, which is about par for such an operation. A dose of 0.23 mg. per kilogram of body weight kills half of a group of mice injected with the substance. From this we can calculate that a man would have to eat 1.7 kg. or 3.7 pounds, to have a fifty per cent chance of dying. This seems a lot of mushrooms to eat at one sitting. Even letting myself go on my favorite mushroom, I have never been able to eat more than half a pound. And all this assumes that muscarine is as toxic when taken by mouth as when it is injected intravenously. Experiments on monkeys show that it is not. After all, the finding of a toxic alkaloid in a plant does not show the plant is inedible. Potatoes for example contain the poisonous solanine, but few die from eating potatoes. It is the amount that is important.

It would seem, therefore, that when there is a strong emotional bias in favor of believing something, no matter how poorly backed up this something may be by evidence, scientists, like other people, allow themselves to be easily persuaded. If you are afraid of mushrooms, it doesn't take much evidence to convince you that they are dangerous. You never stop to reflect that the fear may come from an unconscious attitude you imbibed with your mother's milk.

The moral? Well, there really isn't any. Scientists are just human beings like the rest of us. They are all interested in some certain field of science, and within this field they are critical and careful. Nothing delights them more than finding that another worker in the field has gone off the deep end and published something that the evidence won't support. If they were not like this, science would not advance. But outside their field of competence scientists are no different from other people, and are just as disposed to believe what isn't so.

For this reason, science, although true by and large—we hope—is still studded with fossilized errors, like raisins in a cake, that nobody has yet pointed out. The reason scientists are important and valuable today, and the reason the politicians want more of them*, is not that they are so much brighter than the rest of us. It is just they are working at a branch of knowledge, increasing it—usually rather slowly—making mistakes from time to time, it is true, but doing their best.

THE END

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*So far, apparently, no member of the government has proposed the one sure-fire way of attracting young people into science, which is simply to pay scientists more.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

# THE MAN WHO COUNTS

## BY POUL ANDERSON

Illustrated by van Dongen

***Conclusion. There are times to fight, times to run away, and, as old Van Rijn showed, times to turn the other cheek. And sometimes it's not so easy to spot who is responsible for success or failure....***

## SYNOPSIS

*The planet Diomedes is a freak: twice the size of Earth and half the density; circling its reddish sun in about one year and rotating in twelve and a half hours, but with the axis nearly in the orbital plane. Thus the long, dark, bitter winters of the higher latitudes force the more advanced animals to migrate annually to the tropics. The dense atmosphere has winds of immense thrust, but will support a flying creature the size of a man; the mammalian intelligent natives look rather like dragons. The absence of readily discoverable heavy metals has kept even their most advanced nations in a neolithic state. Earthmen maintain a small trading post on one continent where they exchange metal for local gems and other goods—but not for food, since Terrestrial and Diomedean biochemistries are mutually poisonous.*

*Eric Wace, factor of the Solar Spice & Liquors Company, is guiding the visiting head of his firm, Nicholas van Rijn, on an aerial flight across a great, empty ocean to a certain scenic spot. Van Rijn has along a guest, traveling with him toward Earth, Lady Sandra Tamarin, heiress apparent to the throne of the autonomous colonized world Hermes. He is angling for trade concessions from her; she is looking for a man whose blood can renew her own declining ducal family.*

*Only these three survive when the airship, sabotaged, falls into the sea defined by an archipelago unknown to Earthmen. Their communicator has been destroyed, and Diomedes is so large that even if they survive, search parties without guides will probably not find them before their several months' worth of Terrestrial food supplies is gone.*

*Actually they have ditched in the Sea of Achan, a region currently disputed by the Fleet of Drak'ho and the Great Flock of Lannach. Syranax hyr Urnan, hereditary Grand Admiral of the Fleet, learning from scouts of the shipwreck, sends his Chief Executive Officer, Delp hyr Orikan, to pick up the humans—though no one in this region has ever heard of Earthlings. Delp also rescues their food, but sequesters their other possessions while he interrogates them through another prisoner. This is Tolk, the chief Herald—professional linguist—of Lannach, who among many other languages knows a version of one which Wace can speak.*

*Gradually the humans learn some Drak'ho and get an idea of the situation. The major island here, Lannach, is inhabited by the Flock. This is a typical Diomedean culture of civilized, literate, but rather indolent hunters and herdsmen, loosely organized into matrilineal clans, who migrate south each winter to escape the lightless cold and to breed. They returned this year as usual, before the vernal equinox, and found the Drak'ho invaders in possession of the sea and their own coast.*

*The Fleet is an anomalous society: hard-working fishers and seaweed harvesters, spending their lives on* *great rafts and dugout canoes, governed by a rigid aristocracy, and, for some unknown reason, not bound to the special breeding period of the normal migratory Diomedean—humanlike, they have regular families and reproduce the year around. They are scientifically minded, with a well-developed technology of wood, stone, and ceramics; their special weapons, flamethrowers and firebombs, have given them the edge over the Flock, so that they have driven the Lannachska into desolate upland refuges.*

*They were forced to invade the Sea of Achan because the fish on which they depend have shifted there. The war is made the more bitter, almost a war of extermination, by mutual repugnance at incompatible ways of life; each nation regards the other as being virtually a different species. Since Drak'ho is winning, the admiral has no motive to help the Earthlings; in fact, he naturally hesitates to contact their enigmatic civilization before making sure of his conquest. Nor can anyone think how to cross The Ocean before the Terrestrials' food runs out—though Delp argues that an attempt should be made.*

*Van Rijn, secretly picking up some Lannachamael words from Tolk, has conspired with the Herald. He stirs up the smoldering feud between Delp and Syranax's ambitious, unpopular son, T'heonax. A riot breaks loose between their respective partisans, and in the confusion Van Rijn manages to free Tolk. The fighting is soon quelled and Delp is arrested on charge of mutiny.*

*Tolk carries word of the humans to the Flock's hard-pressed young Commander, Trolwen, who decides to rescue them on the chance they can help him. By using a large force, he manages to steal the humans and most of their supplies off a raft and fly them back to Lannach.*

*At his headquarters, the mountain village Salmenbrok, Trolwen explains the situation further. He must end the war before autumn or see his people ruined, since at that time all the young are born; the mothers must be properly rested and fed thereafter, or they will not survive the long migration south. The humans, of course, are under an even sharper time limit, the end of their rations. Because it feels the labor cannot be spared, and still more because it wants a hold on these incomprehensible wingless monsters, the General Council of Lannach has voted to make no attempt to help them get home, or even send a message to their settlement, until the war is over.*

*Back in the Fleet, Admiral Syranax is taken mortally ill. Delp's wife Rodonis visits T'heonax, the heir, and accuses him of poisoning his father with the Earth food left behind. By the threat of making such an accusation publicly, she blackmails him into pardoning her husband. Actually Rodonis poisoned the admiral herself with metal dust from a coin Van Rijn had given her. Delp is reinstated as Executive, but the ten-*

*sion between him and T'heonax has increased all the more.*

*Van Rijn, in Salmenbrok, sets up a factory along mass-production lines to turn out weapons. He lets Wace do all the actual work, while he gambles and plays politics with the Flock, a fact which Wace resents. But Sandra's presence spurs the younger man on. Van Rijn also introduces the idea of infantry shielded from aerial missiles, a new concept to this winged race. But he cannot get the Flock's leaders to agree to a sound strategy. For quasi-religious reasons they insist, at all hazards, on first retaking the coastal town Mannenach. With the help of various other ideas and techniques Van Rijn has given them, they succeed. But then Delp, who has been sent with a few rafts to reinforce the garrison, handles his units so well that the poorly-trained Lannacha infantry is beaten and the Flock must retreat again.*

*Admiral T'heonax visits the victorious Executive, humiliates him, but finally hears his advice, to follow up this success by ravaging Lannach with most of Drak'ho's fighting strength. Delp thinks this will force the already disheartened enemy to fight a showdown battle which they will probably lose. T'heonax objects that the rafts, the "homeland" of Drak'ho, will be left poorly defended against a massive sortie. Delp answers that purely air-borne troops could not do much harm to such large sea-going vessels, but could easily be fended off until he arrived from the mainland with his expeditionary force and destroyed them. T'heonax then agrees to the proposal, planning to have his rival murdered as soon as the Flock has been disposed of.*

## PART 3

### XV

THIS atmosphere carried the dust particles which are the nuclei of water condensation to a higher, hence colder altitude. Thus Diomedes had more clouds and precipitation of all kinds than Earth. On a clear night you saw fewer stars; on a foggy night you did not see at all.

Mist rolled up through stony dales, until the young High Summer became a dripping chill twilight. The hordes lairing about Salmenbrok mumbled in their hunger and hopelessness: now the sun itself had withdrawn from them.

No campfires glowed, the wood of this region had all been burned. And the hinterland had been scoured clean of game, unripe wild grains, the very worms and insects, eaten by these many warriors. Now, in an eerie dank dark, only the wind and the rushing glacial waters lived . . . and Mount Oborch, sullenly prophesying deep in the earth.

Trolwen and Tolk went from the despair of their chieftains, over narrow trails where fog smoked and the high thin houses stood unreal, to the mill where the Eart'ska worked.

Here alone, it seemed, there was existence—fires still burned, stored water came down flumes to turn the wind-abandoned wheels, movement went under flickering tapers as lathes chattered and hammers thumped. Somehow, in some impossible fashion, Nicholas van Rijn had roared down the embittered protests of Angrek's gang, and their factory was at work.

*Working for what?* thought Trolwen, in a mind as gray as the mist.

Van Rijn himself met them at the door. He folded massive arms on hairy breast and said: "How do you, my friends? Here it goes well, we have soon a many artillery pieces ready."

"And what use will they be?" said Trolwen. "Oh, yes, we have enough to make Salmenbrok well-nigh impregnable. Which means, we could hole up here and let the enemy ring us in till we starve."

"Speak not to me of starving." Van Rijn fished in his pouch, extracted a dry bit of cheese, and regarded it mournfully. "To think, this was not so long ago a rich delicious Swiss. Now, not to rats would I offer it." He stuffed it into his mouth and chewed noisily. "My problem of belly stoking is worse than yours. *Imprimis,* the high boiling point of water here makes this a world of very bad cooks, with no idea about controlled temperatures. *Secundus,* did your porters haul me through the air, all that long lumpy way from Mannenach, to let me hunger into death?"

"I could wish we'd left you down there!" flared Trolwen.

"No," said Tolk. "He and his friends have striven, Flockchief."

"Forgive me," said Trolwen contritely. "It was only . . . I got the news . . . the Lannachska have just destroyed Eiseldrae."

"An empty town, *nie?*"

"A holy town. And they set afire the woods around it." Trolwen arched his back. "This can't go on! Soon, even if we should somehow win, the land will be too desolated to support us."

"I think still you can spare a few forests," said Van Rijn. "This is not an overpopulated country."

"See here," said Trolwen in a harshening tone, "I've borne with you so far. I admit you're essentially right: that to fare out with all our power, for a decisive battle with the massed enemy, is to risk final destruction. But to sit here, doing nothing but make little guerrilla raids on their outposts, while they grind away our nation—that is to make certain we are doomed."

"We needed time," said Van Rijn. "Time to modify the extra field pieces, making up for what we lost at Mannenach."

"Why? They're not portable, without trains. And to make matters worse that motherless Delp has torn up the rails!"

"Oh, yes, they are portable. My young friend Wace has done a little redesigning. Knocked down, with females and cubs to help, everyone carrying a single small piece or two

—we can tote a heavy battery of weapons, by damn!"

"I know. You've explained all this before. And I repeat: what will we use them against? If we set them up at some particular spot, the Lannachska need only avoid that spot. And we can't stay very long in any one place, because our numbers eat it barren." Trolwen drew a breath. "I did not come here to argue, Eart'a. I came from the General Council of Lannach, to tell you that Salmenbrok's food is exhausted—and so is the army's patience. We *must* go out and fight!"

"We shall," said Van Rijn imperturbably. "Come, I will go talk at these puff-head councilors."

He stuck his head in the door: "Wace, boy, best you start to pack what we have. Soon we transport it."

"I heard you," said the younger man.

"Good. You make the work here, I make the politicking, so it goes along fine, *nie?*" Van Rijn rubbed shaggy fists, beamed, and shuffled off with Trolwen and Tolk.

Wace stared after him, into the blind fog-wall. "Yes," he said. "That's how it has been. We work, and he talks. Very equitable!"

"What do you mean?" Sandra raised her head from the table at which she sat marking gun parts with a small paintbrush. A score of females were working beside her.

"What I said. I wonder why I don't say it to his face. I'm not afraid of that fat parasite, and I don't want his mucking paycheck any more." Wace waved at the mill and its sooty confusion. "Do this, do that, he says, and then strolls off again. When I think how he's eating food which would keep *you* alive—"

"You do not understand?" She stared at him for a moment. "No, I think maybe you have been too busy, all the time here, to stop and think. And before then, you were a small-job man without the art of government, not?"

"What do you mean?" he echoed her. He regarded her with eyes washed-out and bleared by fatigue.

"Maybe later. Now we must hurry. Soon we will leave this town, and everything must be set to go."

This time she had found a place for her hands, in the ten or fifteen Earth-days since Mannenach. Van Rijn had demanded that everything—the excess war materièl, which there had luckily not been room enough to take down to battle—be made portable by air. That involved a certain amount of modification, so that the large wooden members could be cut up into smaller units, for reassembly where needed. Wace had managed that. But it would all be one chaos at journey's end, unless there was a system for identifying each item. Sandra had devised the markings and was painting them on.

Neither she nor Wace had stopped for much sleep. They had not even paused to wonder greatly what use there would be for their labor.

"Old Nick did say something about attacking the Fleet itself," muttered Wace. "Has he gone uncon? Are we supposed to land on the water and assemble our catapults?"

"Perhaps," said Sandra. Her tone was serene. "I do not worry so much any more. Soon it will be all decided . . . because we have food for just four Earth-weeks or less."

"We can last at least two months without eating at all," he said.

"But we will be weak." She dropped her gaze. "Eric—"

"Yes?" He left his mill-powered obsidian-toothed circular saw, and came over to stand above her. The dull rush light caught drops of fog in her hair, they gleamed like tiny jewels.

"Soon . . . it will make no matter what I do . . . there will be hard work, needing strength and skill I have not . . . maybe fighting, where I am only one more bow, not a very strong bow even." Her fingernails whitened where she gripped her brush. "So when it comes to that, I will eat no more. You and Nicholas take my share."

"Don't be a fool," he said hoarsely.

She sat up straight, turned around and glared at him. Her pale cheeks reddened. "Do you not be the fool, Eric Wace," she snapped. "If I can give you and him just one extra week where you are strong—where your hunger does not keep you from even thinking clearly—then it will be myself I save too, perhaps. And if not, I have only lost one or two worthless weeks. Now get back to your machine!"

He watched her, for some small while, and his heart thuttered. Then he nodded and returned to his own work.

And down the trails to an open place of harsh grass, where the Council sat on a cliff's edge, Van Rijn picked his steadily swearing way.

The elders of Lannach lay like sphinxes against a skyline gone formless gray, and waited for him. Trolwen went to the head of the double line, Tolk remained by the human.

"In the name of the All-Wise, we are met," said the commander ritually. "Let sun and moons illumine our minds. Let the ghosts of our grandmothers lend us their guidance. May I not shame those who flew before me, nor those who come after." He relaxed a trifle. "Well, my officers, it's decided we can't stay here. I've brought the Eart'a to advise us. Will you explain the alternatives to him?"

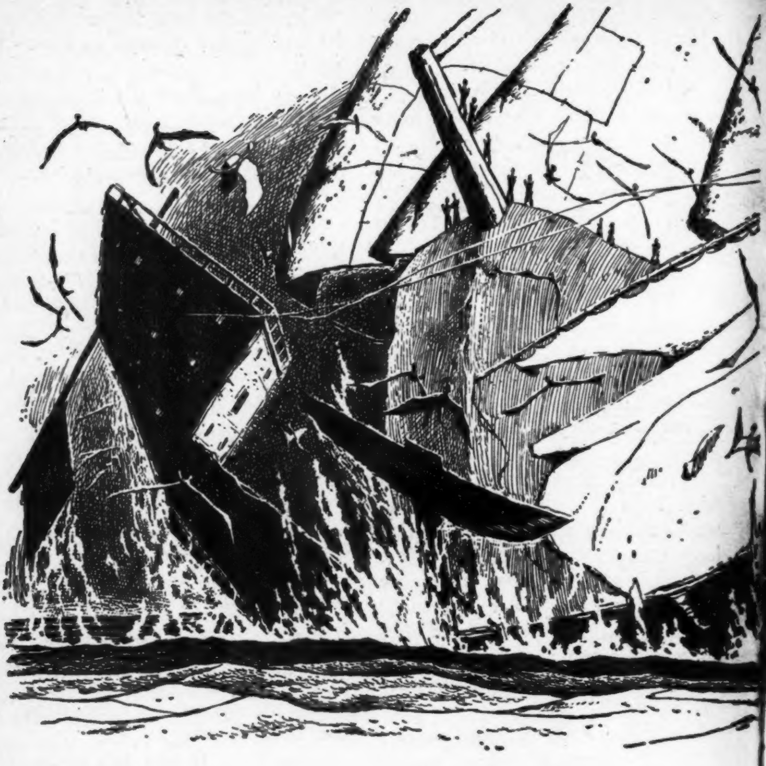
A gaunt, angry-eyed old Lannacha hunched his wings and spat: "First, Flockchief, why is he here at all?"

"By the commander's invitation," said Tolk smoothly.

"I mean . . . Herald, let's not twist words. You know what I mean. The Mannenach expedition was undertaken at his urging. It cost us the worst defeat in our history. Since then, he has insisted our main body stay here, idle, while the enemy ravages an undefended land. I don't see why we should take his advice."

Trolwen's eyes were troubled. "Are there further challenges?" he asked, in a very low voice.

An indignant mumble went down



the lines. "*Yes . . . yes . . . yes . . . let him answer, if he can.*"

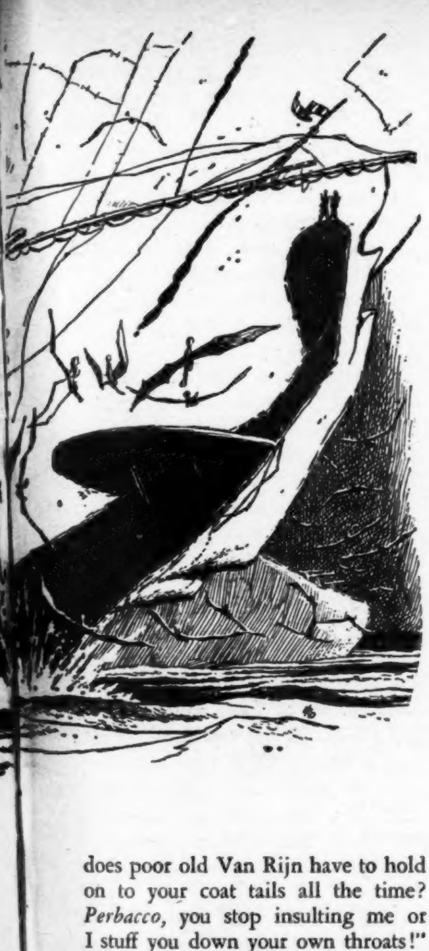
Van Rijn turned turkey red and began to swell like a frog.

"The Eart'a has been challenged in Council," said Trolwen. "Does he wish to reply?"

He sat back then, waiting like the others.

Van Rijn exploded.

"Pest and damnation! Four million worms cocooning in hell! How long am I to be saddled with stupid ungratefuls? How many politicians and brass hats have You Up There plagued this universe with?" He waved his fists in the air and screamed. "Satan and sulfur! It is not to be stood! If you are all so hot to make suicides for yourselves, why



does poor old Van Rijn have to hold on to your coat tails all the time? *Perbacco,* you stop insulting me or I stuff you down your own throats!" He advanced like a moving mountain, roaring at them. The nearest councilors flinched away.

"Eart'a . . . sir . . . officer . . . please!" whispered Trolwen.

When he had them sufficiently browbeaten, Van Rijn said coldly: "All rights. I tell you, by damn. I give you good advices and you stupid them up and blame me—but I am a poor patient old man, not like when I was young and strong no, I suffer it with Christian meekness and keep on giving you good advices.

"I warned you and I warned you, do not hit Mannenach first, I warned you. I told you the rafts could come right up to its walls, and the rafts are the strength of the Fleet. I got down on these two poor old knees, begging and pleading with you first to take the key upland towns, but no, you would not listen to me. And still we *had* Mannenach, but the victory was stupided away . . . oh, if I had wings like an angel, so I could have led you in person! I would be cock-a-doodle-dooing on the admiral's masthead this moment, by holy Nicolai miter! That is why you take my advices, by damn—no, you take my orders! No more backward talking from you, or I wash my hands with you and make my own way home. From now on, if you want to keep living, when Van Rijn says frog, you jump. Understanding?"

He paused. He could hear his own asthmatic wheezes . . . and the far unhappy mumble of the camp, and the cold wet clinking of water down alien rocks . . . nothing more in all the world.

Finally Trolwen said in a weak voice: "If . . . if the challenge is considered answered . . . we shall resume our business."

No one spoke.

"Will the Eart'a take the word?" asked Tolk at last. He alone appeared self-possessed, in the critical glow of one who appreciates fine acting.

"*Ja.* I will say, I know we cannot remain here any more. You ask why I kept the army on leash and let Captain Delp have his way." Van Rijn ticked it off on his fingers. "*Imprimis,* to attack him directly is what he wants; he can most likely beat us, since his force is bigger and not so hungry or discouraged. *Secundus,* he will not advance to Salmenbrok while we are all here, since we could bushwhack him; therefore, by staying put the army has gained me a chance to make ready our artillery pieces. *Tertius,* it is my hope that by all this delay while I had the mill going, we have won the means of victory."

"What?" It barked from the throat of a councilor who forgot formalities.

"Ah." Van Rijn laid a finger to his imposing nose and winked. "We shall see. Maybe now you think even if I am a pitiful old weak tired man who should be in bed with hot toddies and a good cigar, still a Polesotechnic merchant is not just to sneeze at. So? Well, then. I propose we all leave this land and head north."

A hubbub broke loose. He waited patiently for it to subside.

"Order!" shouted Trolwen. "Order!" He slapped the hard earth with his tail. "Quiet, there, officers! . . . Eart'a, there has been some talk of abandoning Lannach altogether—more and more of it, indeed, as our folk lose heart. We could still reach Swampy Kilnu in time to . . . to save most of our females and cubs at Birthtime. But it would be to give up our towns, our fields and forests—everything we have, everything our forebears labored for hundreds of years to create—to sink back into savagery, in a dark fever-haunted jungle, to become nothing—I myself will die in battle before making such a choice."

He drew a breath and hurled out: "But Kilnu is, at least, to the south. North of Achan, there is still ice!"

"Just so," said Van Rijn.

"Would you have us starve and freeze on the Dawrnach glaciers? We can't land any further south than Dawrnach; the Fleet's scouts would be certain to spot us anywhere in Holmenach. Unless you want to fight the last fight in the archipelago—?"

"No," said Van Rijn. "We should sneak up to this Dawrnach place. We can pack a lunch—take maybe a tendays' worth of food and fuel with us, as well as the armament—*nie?*"

"Well . . . yes . . . but even so—Are you suggesting we should attack the Fleet itself, the rafts, from the north? It would be an unexpected direction. But it would be just as hopeless."

"Surprise we will need for my plan," said Van Rijn. "*Ja.* We cannot tell the army. One of them might be captured in some skirmish and made to tell the Drak'honai. Best maybe I not even tell you."

"Enough!" said Trolwen. "Let me hear your scheme."

Much later: "It won't work. Oh, it might well be technically feasible. But it's a political impossibility."

"Politics!" groaned Van Rijn. "What is it this time?"

"The warriors . . . yes, and the females too, even the cubs, since it would be our whole nation which goes to Dawrnach. They must be told why we do so. Yet the whole scheme, as you admit, will be ruined if one person falls into enemy hands and tells what he knows under torture."

"But he need not know," said Van Rijn. "All he need be told is, we spend a little while gathering food and wood to travel with. Then we are to pack up and go some other place, he has not been told where or why."

"We are not Drakska," said Trolwen angrily. "We are a free folk. I have no right to make so important a decision without submitting it to a vote."

"Hm-m-m maybe you could talk to them?" Van Rijn tugged his mustaches. "Orate at them. Persuade them to waive their right to know and help decide. Talk them into following you with no questions."

"No," said Tolk. "I'm a specialist in the arts of persuasion, Eart'a, and I've measured the limits of those arts. We deal less with a Flock now than a mob—cold, hungry, without hope, without faith in its leaders, ready to give up everything—or rush forth to blind battle—they haven't the morale to follow anyone into an unknown venture."

"Morale can be pumped in," said Van Rijn. "I will try."

*"You!"*

"I am not so bad at oratings, myself, when there is need. Let me address them."

"They . . . they—" Tolk stared at him. Then he laughed, a jarringly sarcastic note. "Let it be done, Flockchief. Let's hear what words this Eart'a can find, so much better than our own."

And an hour later, he sat on a bluff, with his people a mass of shadow below him, and he heard Van Rijn's bass come through the fog like thunder:

" . . . I say only, think what you have here, and what they would take away from you:

*"This royal throne of kings, this sceptr'd isle,*
*This earth of majesty, this seat of Mars,*
*This other Eden, demi-paradise,*
*This fortress built by Nature for herself*
*Against infection and the hand of war,*
*This happy breed . . ."*

"I don't comprehend all those words," whispered Tolk.

"Be still!" answered Trolwen. "Let me hear." There were tears in his eyes; he shivered.

*" . . . This blessed plot, this earth, this realm, this Lannach . . ."*

The army beat its wings and screamed.

Van Rijn continued through adaptations of Pericles' funeral speech, "Scots Wha' Hae," and the Gettysburg Address. By the time he had finished discussing St. Crispin's Day, he could have been elected commander if he chose.

## XVI

The island called Dawrnach lay well beyond the archipelago's end, several hundred kilometers north of Lannach. However swiftly the Flock flew, with pauses for rest on some bird-shrieking skerry, it was a matter of Earth-days to get there, and a physical nightmare for humans trussed in carrying nets. Afterward Wace's recollections of the trip were dim.

When he stood on the beach at their goal, his legs barely supporting him, it was small comfort.

High Summer had come here also, and this was not too far north; still, the air remained wintry and Tolk said no one had ever tried to live here. The Holmenach islands deflected a cold current out of The Ocean, up into the Iceberg Sea, and those bitter waters flowed around Dawrnach.

Now the Flock, wings and wings and wings dropping down from the sky until they hid its roiling grayness, had reached journey's conclusion: black sands, washed by heavy dark tides and climbing sheer up through permanent glaciers to the inflamed throat of a volcano. Thin straight trees were sprinkled over the lower slopes, between quaking tussocks; there were a few sea birds, to dip above the broken offshore ice-floes; otherwise the hidden sun threw its clotted-blood light on a sterile country.

Sandra shuddered. Wace was shocked to see how thin she had already grown. And now that they were here, in the last phase of their striving—belike of their lives—she intended to eat no more.

She wrapped her stinking coarse jacket more tightly about her. The wind caught snarled pale elflocks of her hair and fluttered them forlorn against black igneous cliffs. Around her crouched, walked, wriggled, and flapped ten thousand angry dragons: whistles and gutturals of unhuman speech, the cannon-crack of leathery wings, overrode the empty wind-whimper. As she rubbed her eyes, pathetically like a child, Wace saw that her once beautiful hands were bleeding where they had clung to the net, and that she shook with weariness.

He felt his heart twisted, and moved toward her. Nicholas van Rijn got there first, fat and greasy, with a roar for comfort: "So, by jolly damn, now we are here and soon I get you home again to a hot bath. Holy St. Dismas, right now I smell you three kilometers upwind!"

Lady Sandra Tamarin, heiress to the Grand Duchy of Hermes, gave him a ghostly smile. "If I could rest for a little—" she whispered.

"*Ja, ja,* we see." Van Rijn stuck two fingers in his mouth and let out an eardrum-breaking blast. It caught Trolwen's attention. "You there!

Find her here a cave or something and tuck her in."

"I?" Trolwen bridled. "I have the Flock to see to!"

"You heard me, pot head." Van Rijn stumped off and buttonholed Wace. "Now, then. You are ready to begin work? Round up your crew, however many you need to start."

"I—" Wace backed away. "Look here, it's been I don't know how many hours since our last stop, and—"

Van Rijn spat. "And how many weeks makes it since *I* had a smoke or even so much a little glass Genever, ha? You have no considerations for other people." He pointed his beak heavenward and screamed: "Do I have to do everything? Why have You Up There filled up the galaxy with no-good loafers? It is not to be stood!"

"Well . . . well—" Wace saw Trolwen leading Sandra off, to find a place where she could sleep, forgetting cold and pain and loneliness for a few niggard hours. He struck a fist into his palm and said: "All right! But what will you be doing?"

"I must organize things, by damn. First I see Trolwen about a gang to cut trees and make masts and yards and oars. Meanwhiles all this canvas we have brought along has got to somehow be made in sails; and there are the riggings; and also we must fix up for eating and shelter— Bah! These is all details. It is not right I should be bothered. Details, I hire ones like you for."

"Is life anything but details?" snapped Wace.

Van Rijn's small gray eyes studied him for a moment. "So," rumbled the merchant, "it gives back talks from you too, ha? You think maybe just because I am old and weak, and do not stand so much the hardships like when I was young . . . maybe I only leech off your work, *nie?* Now is too small time for beating sense into your head. Maybe you learn for yourself." He snapped his fingers. "Jump!"

Wace went off, damning himself for not giving the old pig a fist in the stomach. He would, too, come the day! Not now . . . unfortunately, Van Rijn had somehow oozed into a position where it was him the Lannachska looked up to . . . instead of Wace, who did the actual work— Was that a paranoid thought? No.

Take this matter of the ships, for instance. Van Rijn had pointed out that an island like Dawrnach, loaded with pack ice and calving glaciers, afforded plenty of building material. Stone chisels would shape a vessel as big as any raft in the Fleet, in a few hours' work. The most primitive kind of blowtorch, an oil lamp with a bellows, would smooth it off. A crude mast and rudder could be planted in holes cut for the purpose: water, refreezing, would be a strong cement. With most of the Flock, males, females, old, young, made one enormous labor force for the project, a flotilla comparable in numbers to the whole Fleet could be made in a week.

*If* an engineer figured out all the practical procedure. How deep a hole to step your mast in? Is ballast needed? Just how do you make a nice clean cut in an irregular ice block hundreds of meters long? How about smoothing the bottom to reduce drag? The material was rather friable; it could be strengthened considerably by dashing bucketsful of mixed sawdust and sea water over the finished hull, letting this freeze as a kind of armor—but what proportions?

There was no time to really test these things. Somehow, by God and by guess, with every element against him, Eric Wace was expected to produce.

And Van Rijn? What did Van Rijn contribute? The basic idea, airily tossed off, apparently on the assumption that Wace was Aladdin's jinni. Oh, it was quite a flash of imaginative insight, no one could deny that. But imagination is cheap.

Anyone can say: "What we need is a new weapon, and we can make it from such-and-such unprecedented materials." But it will remain an idle fantasy until somebody shows up who can figure out *how* to make the needed weapon.

So, having enslaved his engineer, Van Rijn strolled around, jollying some of the Flock and bullying some of the others—and when he had them all working their idiotic heads off, he rolled up in a blanket and went to sleep!

## XVII

Wace stood on the deck of the *Rijstaffel* and watched his enemy come over the world's rim.

Slowly, he reached into the pouch at his side. His hand closed on a chunk of stale bread and a slab of sausage. It was the last Terrestrial food remaining: for Earth-days, now, he had gone on a still thinner ration than before, so that he could enter this battle with something in his stomach.

He found that he didn't want it after all.

Surprisingly little cold breathed up from underfoot. The warm air over the Sea of Achan wafted the ice-chill away. He was less astonished that there had been no appreciable melting in the week he estimated they had been creeping southward; he knew the thermal properties of water.

Behind him, primitive square sails, lashed to yardarms of green wood on overstrained one-piece masts, bellied in the north wind. These ice ships were tubby, but considerably less so than a Drak'ho raft; and with some unbelievable talent for tyranny, Van Rijn had gotten reluctant Lannachska to work under frigid sea water, cutting the bottoms into a vaguely streamlined shape. Now, given the power of a Diomedean breeze, Lannach's war fleet waddled through Achan waves at a good five knots.

Though the hardest moment, Wace reflected, had not been while they worked their hearts out to finish the craft. It had come afterward, when they were almost ready to leave and the winds turned contrary. For a period measured in Earth-days, thousands of Lannachska huddled soul-sick under freezing rains, ranging after fish and bird rookeries to feed cubs that cried with hunger. Councilors and clan leaders had argued that this was a war on the Fates: there could be no choice but to give up and seek out Swampy Kilnu. Somehow, blustering, whining, pleading, promising—in a few cases, bribing, with what he had won at dice—Van Rijn had held them on Dawrnach.

Well—it was over with.

The merchant came out of the little stone cabin, walked over the gravel-strewn deck past crouching war-engines and heaped missiles, till he reached the bows where Wace stood.

"Best you eat," he said. "Soon gives no chance."

"I'm not hungry," said Wace.

"So, no?" Van Rijn grabbed the sandwich out of his fingers. "Then, by damn, I am!" He began cramming it between his teeth.

Once again he wore a double set of armor, but he had chosen one weapon only for this occasion, an outsize stone ax with a meter-long handle. Wace carried a smaller tomahawk and a shield. Around the humans, it bristled with armed Lannachska.

"They're making ready to receive us, all right," said Wace. His eyes sought out the gaunt enemy war-canoes, beating upwind.

"You expected a carpet with acres and acres, like they say in America? I bet you they spotted us from the air hours ago. Now they send messengers hurry-like back to their army in Lannach." Van Rijn held up the last fragment of meat, kissed it reverently, and ate it.

Wace's eyes traveled backward. This was the flagship—chosen as such when it turned out to be the fastest—and had the forward position in a long wedge. Several score grayish-white, ragged-sailed, helter-skelter little vessels wallowed after. They were outnumbered and outgunned by the Drak'ho rafts, of course; they just had to hope the odds weren't too great. The much lower freeboard did not matter to a winged race, but it would be important that their crews were not very skilled sailors—

But at least the Lannachska were fighters. Winged tigers by now, thought Wace. The southward voyage had rested them, and trawling had provided the means to feed them, and the will to battle had kindled again. Also, though they had a smaller navy, they probably had more warriors, even counting Delp's absent army.

And they could afford to be reckless. Their females and young were still on Dawrnach—with Sandra, grown so white and quiet—and they had no treasures along to worry about. For cargo they bore just their weapons and their hate.

From the clouds of air-borne, Tolk the Herald came down. He braked on extended wings, slithered to a landing, and curved back his neck swan-fashion to regard the humans.

"Does it all go well down here?" he asked.

"As well as may be," said Van Rijn. "Are we still bearing on the pest-rotten Fleet?"

"Yes. It's not many buaska away now. Barely over your sea-level horizon, in fact; you'll raise it soon. They're using sail and oars alike, trying to get out of our path, but they'll not achieve it if we keep this wind and those canoes don't delay us."

"No sign of the army in Lannach?"

"None yet. I daresay what's-his-name . . . the new admiral that we heard about from those prisoners . . . has messengers scouring the mountains. But that's a big land up there. It will take time to locate him." Tolk snorted professional scorn. "Now *I* would have had constant liaison, a steady two-way flow of Whistlers."

"Still," said Van Rijn, "we must expect them soon, and then gives hell's safety valve popping off."

"Are you certain we can—"

"I am certain of nothings. Now get back to Trolwen and oversee."

Tolk nodded and hit the air again.

Dark purplish water curled in white feathers, beneath a high heaven where clouds ran like playful mountains, tinted rosy by the sun. Not many kilometers off, a small island rose sheer; through a telescope, Wace could count the patches of yellow blossom nodding under tall bluish conifers. A pair of young Whistlers dipped and soared over his head, dancing like the gay clan banners being unfurled in the sky. It was hard to understand that the slim carved boats racing so near bore fire and sharpened stones.

"Well," said Van Rijn, "here begins our fun. Good St. Dismas, stand by me now."

"St. George would be a little more appropriate, wouldn't he?" asked Wace.

"You may think so. Me, I am too old and fat and cowardly to call on Michael or George or Olaf or any like those soldierly fellows. I feel more at home, me, with saints not so bloody energetic, Dismas or my own good namesake who is so kind to travelers."

"And is also the patron of highway men," remarked Wace. He wished his tongue wouldn't get so thick and dry on him. He felt remote, somehow . . . not really afraid . . . but his knees were rubbery.

"Ha!" boomed Van Rijn. "Good shootings, boy!"

The forward ballista on the *Rijstaffel,* with a whine and a thump, had smacked a half-ton stone into the nearest canoe. The boat cracked like a twig; its crew whirled up, a squad from Trolwen's aerial command pounced, there was a moment's murderous confusion and then the Drak'honai had stopped existing.

Van Rijn grabbed the astonished ballista captain by the hands and danced him over the deck, bawling out,

*"Du bist mein Sonnenschein, mein*

*einzig Sonnenschein, du machst mir freulich—"*

Another canoe swung about, close-hauled. Wace saw its flamethrower crew bent over their engine and hurled himself flat under the low wall surrounding the ice deck.

The burning stream hit that wall, splashed back, and spread itself on the sea. It could not kindle frozen water, nor melt enough of it to notice. Sheltered amidships, a hundred Lannacha archers sent an arrow-sleet up, to arc under heaven and come down on the canoe.

Wace peered over the wall. The flamethrower pumpman seemed dead, the hoseman was preoccupied with a transfixed wing . . . no steersman either, the canoe's boom slatted about in a meaningless arc while its crew huddled— "Dead ahead!" he roared. "Ram them!"

The Lannacha ship trampled the dugout underfoot.

Drak'ho canoes circled like wolves around a buffalo herd, using their speed and maneuverability. Several darted between ice vessels, to assail from the rear; others went past the ends of the wedge formation. It was not quite a one-sided battle—arrows, catapult bolts, flung stones, all hurt Lannachska; oil jugs arced across the water, exploding on ice decks; now and then a fire stream ignited a sail.

But winged creatures with a few buckets could douse burning canvas. During all that phase of the engagement, only one Lannacha craft was wholly dismasted, and its crew simply abandoned it, parceling themselves out among other vessels. Nothing else could catch fire, except live flesh, which has always been the cheapest article in war.

Several canoes, converging on a single ship, tried to board. They were nonetheless outnumbered, and paid heavily for the attempt. Meanwhile Trolwen, with absolute air mastery, swooped and shot and hammered.

Drak'ho's canoes scarcely hindered the attack. The dugouts were rammed, broken, set afire, brushed aside by their unsinkable enemy.

By virtue of being first, of having more or less punched through the line, the *Rijstaffel* met little opposition. What there was, was beaten off by catapult, ballista, fire pot, and arrows: long-range gunnery. The sea itself burned and smoked behind; ahead lay the great rafts.

When those sails and banners came into view, Wace's dragon crewmen began to sing the victory song of the Flock.

"A little premature, aren't they?" he cried above the racket.

"Ah," said Van Rijn quietly, "let them make fun for now. So many will soon be down, blind among the fishes, *nie?*"

"I suppose—" Hastily, as if afraid of what he had done merely to save his own life, Wace said: "I like that melody, don't you? It's rather like some old American folk songs. *John Harty,* say."

"Folk songs is all right if you should want to play you are Folk in great big capitals," snorted Van

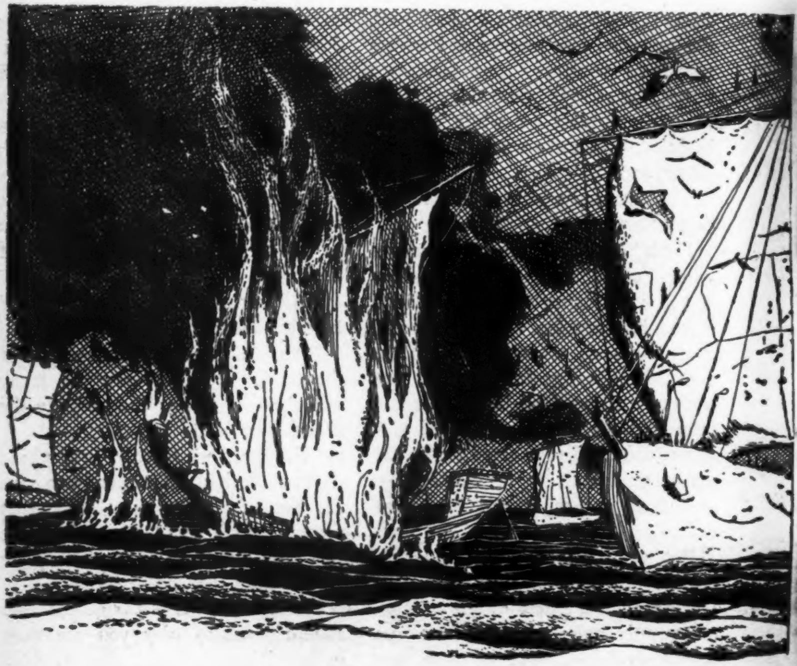
Rijn. "I stick with Mozart, by damn."

He stared down into the water, and a curious wistfulness tinged his voice. "I always hoped maybe I would understand Bach some day, before I die, old Johann Sebastian who talked with God in mathematics. I have not the brains, though, in this dumb old head. So maybe I ask only one more chance to listen at *Eine Kleine Nacht-musik.*"

There was an uproar in the Fleet. Slowly and ponderously, churning the sea with spider-leg oars, the rafts were giving up their attempt at evasion. They were pulling into war formation.

Van Rijn waved angrily at a Whistler. "Quick! You get upstairs fast, and tell that crockhead Trolwen not to bother air-covering us against the canoes. Have him attack the rafts. Keep them busy, by hell! Don't let messengers flappity-flap between enemy captains so they can organize!"

As the young Lannacha streaked away, the merchant tugged his goatee



—almost lost by now in a dirt-stiffened beard—and snarled: "Great hairy honeypots! How long do I have to do all the thinkings? Good St. Nicholas, you bring me an officer staff with brains between the ears, instead of clabbered oatmeal, and I build you a cathedral on Mars! You hear me?"

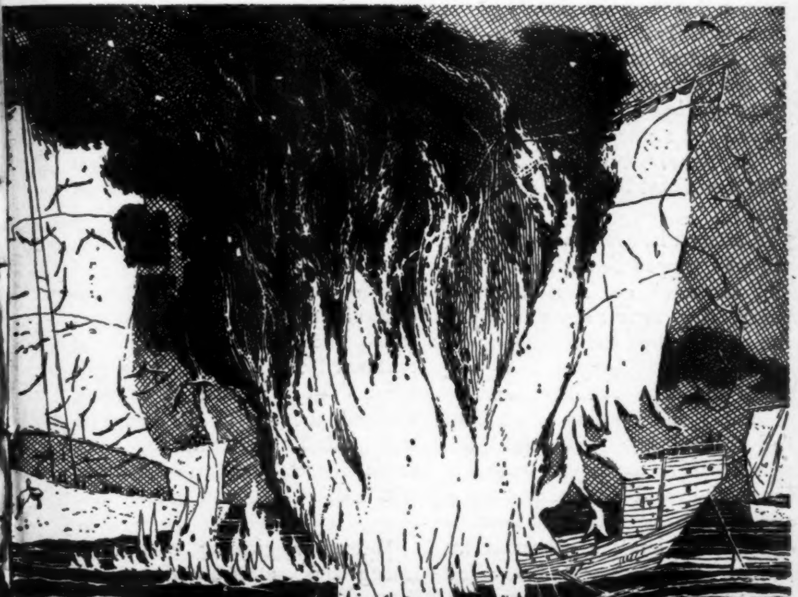
"Trolwen is in the midst of a fight up there," protested Wace. "You can't expect him to think of everything."

"Maybe not," conceded Van Rijn grudgingly. "Maybe I am the only one in all the galaxy who makes no mistakes."

Horribly near, the massed rafts became a storm when Trolwen took his advice. Bat-winged devils sought each other's lives through one red chaos. Wace thought his own ships' advance must be nearly unnoticed in that whirling, shrieking destruction.

"They're *not* getting integrated!" he said, beating his fist on the wall. "Before God, they're not!"

A Whistler landed, coughing blood; there was a monstrous bruise on his side. "Over there . . . Tolk



the Herald says . . . empty spot . . . drive wedge in Fleet—" The thin body arced and then slid inertly to the deck. Wace stooped, taking the unhuman youth in his arms. He heard blood gurgle in lungs pierced by the broken ends of ribs.

"Mother, mother," gasped the Whistler. "He hit me with an ax. Make it stop hurting, mother."

Presently he died.

Van Rijn cursed his awkward vessel into a course change—not more than a few degrees, it wasn't capable of more, but as the nearer rafts began to loom above the ice deck, it could be seen that there was a wide gap in their line. Trolwen's assault had so far prevented its being closed. Red-stained water, littered with dropped spears and bows, pointed like a hand toward the admiral's floating castle.

"In there!" bawled Van Rijn. "Clobber them! Eat them for breakfast!"

A catapult bolt came whirring over the wall, ripped through his sleeve and showered ice chips where it struck. Then three streams of liquid fire converged on the *Rijstaffel.*

Flame fingers groped their way across the deck, one Lannacha lay screaming and charring where they had touched him, and found the sails. It was no use to pour water this time: oil-drenched, mast and rigging and canvas became one great torch.

Van Rijn left the helmsman he had been swearing at and bounded across the deck, slipped where some of it had melted, skated on his broad bottom till he fetched up against a wall, and crawled back to his feet calling down damnation on the cosmos. Up to the starboard shrouds he limped, and his stone ax began gnawing the cordage. "Here!" he yelled. "Fast! Help me, you jelly-bones! Quick, have you got fur on the brain, quick before we drift past!"

Wace, directing the ballista crew, which was stoning a nearby raft, understood only vaguely. Others were more ready than he. They swarmed to Van Rijn and hewed. He himself sought the racked oil bombs and broke one at the foot of the burning mast.

Its socket melted, held up only by the shrouds, the enormous torch fell to port when the starboard lines were slashed. It struck the raft there; flames ran from it, beating back frantic Drak'ho crewmen who would push it loose; rigging caught; timbers began to char. As the *Rijstaffel* drifted away, that enemy vessel turned into a single bellowing pyre.

Now the ice ship was nearly uncontrollable, driven by momentum and chance currents deeper into the confused Fleet. But through the gap which Van Rijn had so ardently widened, the rest of the Lannacha craft pushed. War-flames raged between floating monsters—but wood will burn and ice will not.

Through a growing smoke-haze, among darts and arrows that rattled down from above, on a deck strewn with dead and hurt but still filled by the revengeful hale, Wace trod to the nearest bomb crew. They were preparing to ignite another raft as soon as the ship's drift brought them into range.

"No," he said.

"What?" The captain turned a sooty face to him, crest adroop with weariness. "But sir, they'll be pumping fire at us!"

"We can stand that," said Wace. "We're pretty well sheltered by our walls. I don't want to burn that raft. I want to capture it!"

The Diomedean whistled. Then his wings spread and his eyes flared and he asked: "May I be the first on board it?"

Van Rijn passed by, hefting his ax. He could not have heard what was said, but he rumbled: "*Ja.* I was just about to order this. We can use us a transportation that maneuvers."

The word went over the ship. Its slippery deck darkened with armed shapes that waited. Closer and closer, the wrought ice-floe bore down on the higher and more massive raft. Fire, stones, and quarrels reached out for the Lannachska. They endured it, grimly. Wace sent a Whistler up to Trolwen to ask for help; a flying detachment silenced the Drak'ho artillery with arrows.

Trolwen still had overwhelming numerical superiority. He could choke the sky with his warriors, pinning the Drak'honai to their decks to await sea-borne assault. So far, thought Wace, Diomedes' miserly gods had been smiling on him. It couldn't last much longer.

He followed the first Lannacha wave, which had flown to clear a bridgehead on the raft. He sprang from the ice-floe when it bumped to a halt, grasped a massive timber, and scrambled up the side. When he reached the top and unlimbered his tomahawk and shield, he found himself in a line of warriors. Smoke from the burnings elsewhere stung his eyes; only indistinctly did he see the defending Drak'honai, pulled into ranks ahead of him and up on the higher decks.

Had the yelling and tumbling about overhead suddenly redoubled?

A stumpy finger tapped him. He turned around to meet Van Rijn's porcine gaze.

"Whoof and whoo! What for a climb that was! Better I should have stayed, *nie?* Well, boy, we are on our own now. Tolk just sent me word, the whole Drak'ho Expeditionary Force is in sight and lolloping hereward fast."

## XVIII

Briefly, Wace felt sick. Had it all come to this, a chipped flint in his skull after Delp's army had beaten off the Lannachska?

Then he remembered standing on the cold black beach of Dawrnach, shortly before they sailed, and wondering aloud if he would ever again speak with Sandra. "I'll have the easy part if we lose," he had said. "It'll be over quickly enough for me. But you—"

She gave him a look that brimmed with pride, and answered: "What makes you think you can lose?"

He hefted his weapon. The lean winged bodies about him hissed, bristled, and glided ahead.

These were mostly troopers from the Mannenach attempt; every ice ship bore a fair number who had been taught the elements of ground fighting. And on the whole trip south to find the Fleet, Van Rijn and the Lannacha captains had exhorted them: "Do not join our aerial forces. Stay on the decks when we board a raft. This whole plan hinges on how many rafts we can seize or destroy. Trolwen and his air squadrons will merely be up there to support *you*."

The idea took root reluctantly in any Diomedean brain. Wace was not at all certain it wouldn't die within the next hour, leaving him and Van Rijn marooned on hostile timbers while their comrades soared up to a pointless sky battle. But he had no choice, save to trust them now.

He broke into a run. The screech that his followers let out tore at his eardrums.

Wings threshed before him. Instinctively, the untrained Drak'ho lines were breaking up. Through geological eras, the only sane thing for a Diomedean to do had been to get above an attacker. Wace stormed on where they had stood.

Lifting from all the raft, enemy sailors stooped on these curious unflying adversaries. A Lannacha forgot himself, flapped up, and was struck by three meteor bodies. He was hurled like a broken puppet into the sea. The Drak'honai rushed downward. And they met spears which snapped up like a picket fence. No few of Lannach's one-time ground troopers had rescued their basketwork shields from the last retreat and were now again transformed into artificial turtles. The rest fended off the aerial assault—and the archers made ready.

Wace heard the sinister whistle rise behind him, and saw fifty Drak'honai fall.

Then a dragon roared in his face, striking with a knife-toothed rake. Wace caught the blow on his shield. It shuddered in his left arm, numbing the muscles. He lashed out a heavy-shod foot, caught the hard belly and heard the wind leave the Drak'ho. His tomahawk rose and fell with a dull chopping sound. The Diomedean fluttered away, pawing at a broken wing.

Wace hurried on. The Drak'honai, stunned by the boarding party's tactics, were now milling around overhead out of bowshot. Females snarled in the forecastle doors, spreading wings to defend their screaming cubs. They were ignored: the object was to capture the raft's artillery.

Someone up there must have seen what was intended. His hawk-shriek and hawk-stoop were ended by a Lannacha arrow; but then an organized line peeled off the Drak'honai mass, plummeted to the forecastle deck, and took stance before the main battery of flamethrowers and ballistae.

"So!" rumbled Van Rijn. "They make happy fun games after all. We see about this!"

He broke into an elephantine trot, whirling the great mallet over his head. A slingstone bounced off his leather-decked abdomen, an arrow ripped along one cheek, blowgun darts pincushioned his double cuirass. He got a boost from two winged guards, up the sheer ladderless bulkhead of the forecastle. Then he was in among the defenders.

*"Je maintiendrai!"* he bawled, and stove in the head of the nearest Drak'ho. *"God send the right!"* he shouted, stamping on the shaft of a rake that clawed after him. *"Fram, fram, Kristmenn, Krossmenn, Kongsmenn!"* he bellowed, drumming on the ribs of three warriors who ramped close. *"Heineken's Bier!"* he trumpeted, turning to wrestle with a winged shape that fastened onto his back, and wringing its neck.

Wace and the Lannachska joined him. There was an interval with hammer and thrust and the huge bone-breaking buffets of wing and tail. The Drak'honai broke. Van Rijn sprang to the flamethrower and pumped. "Aim the hose!" he panted. "Flush them out, you bat-infested heads!" A gleeful Lannacha seized the ceramic nozzle, pressed the hardwood ignition piston, and squirted burning oil upward.

Down on the lower decks, ballistae began to thump, catapults sang and other flamethrowers licked. A party from the ice ship reassembled one of their wooden machine guns and poured darts at the last Drak'ho counterassault.

A female shape ran from the forecastle. "It's our husbands they kill!" she shrieked. "Destroy them!"

Van Rijn leaped off the upper deck, a three-meter fall. Planks thundered and groaned when he hit them. Puffing, waving his arms, he got ahead of the frantic creature. "Get back!" he yelled in her own language. "Back inside! Shoo! Scat! Want to leave your cubs unprotected? I eat young Drak'honai! With horseradish!"

She wailed and scuttled back to shelter. Wace let out a gasp. His skin was sodden with sweat. It had not been too serious a danger, perhaps . . . in theory, a female mob could have been massacred under the eyes of its young . . . but who could bring himself to that? Not Eric Wace, certainly. Better give up and take one's spear thrust like a gentleman.

He realized, then, that the raft was his.

Smoke still thickened the air too much for him to see very well what was going on elsewhere. Now and then, through a breach in it, appeared some vision: a raft set unquenchably afire, abandoned; an ice vessel, cracked, dismasted, arrow-swept, still bleakly slugging it out; another Lannacha ship laying to against a raft, another boarding party; the banner of a Lannacha clan blowing in sudden triumph on a foreign masthead. Wace had no idea how the sea fight as a whole was going—how many ice craft had been raked clean, deserted by discouraged crews, seized by Drak'ho counterattack, left drifting uselessly remote from the enemy.

It had been perfectly clear, he thought—Van Rijn had said it bluntly enough to Trolwen and the Council—that the smaller, less well equipped, virtually untrained Lannacha navy would have no chance whatsoever of decisively whipping the Fleet. The crucial phase of this battle was not going to involve stones or flames.

He looked up. Beyond the spars and lines, where the haze did not reach, heaven lay unbelievably cool. The formations of war, weaving in and about, were so far above him that they looked like darting swallows.

Only after minutes did his inexpert eye grasp the picture.

With most of his force down among the rafts, Trolwen was ridiculously outnumbered in the air as soon as Delp arrived. On the other hand, Delp's folk had been flying for hours to get here; they were no match individually for well-rested Lannachska. Realizing this, each commander used his peculiar advantage: Delp ordered unbreakable mass charges, Trolwen used small squadrons which swooped in, snapped wolfishly, and darted back again. The Lannachska retreated all the time, except when Delp tried to send a large body of warriors down to relieve the rafts. Then the entire, superbly integrated air force at Trolwen's disposal would smash into that body. It would disperse when Delp brought in reinforcements, but it had accomplished its purpose—to break up the formation and checkrein the seaward movement.

So it went, for some timeless time in the wind under the High Summer sun. Wace lost himself, contemplating the terrible beauty of death winged and disciplined. Van Rijn's voice pulled him grudgingly back to luckless unflying humanness.

"Wake up! Are you making dreams, maybe, like you stand there with your teeth hanging out and flapping in the breeze? Lightnings and Lucifer! If we want to keep this raft, we have to make some use with it, by damn. You boss the battery here and I go tell the helmsman what to do. So!" He huffed off, like an ancient steam locomotive in weight and noise and sootiness.

They had beaten off every attempt at recapture, until the expelled crew went wrathfully up to join Delp's legions. Now, awkwardly handling the big sails, or ordered protestingly below to the sweeps, Van Rijn's gang got their new vessel into motion. It grunted its way across a roiled, smoky waste of water, until a Drak'ho craft loomed before it. Then the broadsides cut loose, the arrows went like sleet, and crew locked with crew in troubled air midway between the thuttering rafts.

Wace stood his ground on the foredeck, directing the fire of its banked engines: stones, quarrels, bombs, oilstreams, hurled across a few meters to shower splinters and char wood as they struck. Once he organized a bucket brigade, to put out the fire set by an enemy hit. Once he saw one of his new catapults, and its crew, smashed by a two-ton rock, and forced the survivors to lever that stone into the sea and rejoin the fight. He saw how sails grew tattered, yards sagged drunkenly, bodies heaped themselves on both vessels after each clumsy round. And he wondered, in a dim part of his brain, why life had no more sense, anywhere in the known universe, than to be forever tearing itself.

Van Rijn did not have the quality of crew to win by sheer bombardment, like a neolithic Nelson. Nor did he especially want to try boarding still another craft; it was all his little tyro force could do to man and fight this one. But he pressed stubbornly in, holding the helmsmen to their collision course, going belowdecks himself to keep exhausted Lannachska at their heavy oars. And his raft wallowed its way through a firestorm, a stonestorm, a storm of living bodies, until it was almost on the enemy vessel.

Then horns hooted among the Drak'honai, their sweeps churned water and they broke from their place in the Fleet's formation to disengage.

Van Rijn let them go, vanishing into the hazed masts and cordage that reached for kilometers around him. He stumped to the nearest hatch, went down through the poopdeck cabins and so out on the main deck. He rubbed his hands and chortled. "Aha! We gave him a little scare, eh, what say? He'll not come near any of our boats soon again, him!"

"I don't understand, councilor," said Angrek, with immense respect. "We had a smaller crew, with far less skill. He ought to have stayed put, or even moved in on us. He could have wiped us out, if we didn't abandon ship altogether."

"Ah!" said Van Rijn. He wagged a sausagelike finger. "But you see, my young and innocent one, he is carrying females and cubs, as well as many valuable tools and other goods. His whole life is on his raft. He dare not risk its destruction; we could so easy set it hopeless afire, even if we can't make capture. Ha! It will be a frosty morning in hell when they outthink Nicholas van Rijn, by damn!"

"Females—" Angrek's eyes shifted to the forecastle. A lickerish light rose in them.

"After all," he murmured, "it's not as if they were *our* females—"

A score or more Lannachska were already drifting in that same direction, elaborately casual—but their wings were held stiff and their tails twitched. It was noteworthy that more of the recent oarsmen were in that group than any other class.

Wace came running to the forecastle's edge. He leaned over it, cupped his hands and shouted: "Freeman van Rijn! Look upstairs!"

"So." The merchant raised pouched little eyes, blinked, sneezed, and blew his craggy nose. One by one, the Lannachska resting on scarred bloody decks lifted their own gaze skyward. And a stillness fell on them.

Up there, the struggle was ending.

Delp had finally assembled his forces into a single irresistible mass and taken them down as a unit to sea level. There they joined the embattled raft crews—one raft at a time. A Lannachska boarding party, so suddenly and grossly outnumbered, had no choice but to flee, abandon even its own ice ship, and go up to Trolwen.

The Drak'honai made only one attempt to recapture a raft which was fully in Lannacha possession. It cost them gruesomely. The classic dictum still held, that purely air-borne forces were relatively impotent against a well-defended unit of the Fleet.

Having settled in this decisive manner exactly who held every single raft, Delp reorganized and led a sizable portion of his troops aloft again to engage Trolwen's augmented air squadrons. If he could clear them away, then, given the craft remaining to Drak'ho plus total sky domination, Delp could regain the lost vessels.

But Trolwen did not clear away so easily. And, while naval fights such as Van Rijn had been waging went on below, a vicious combat traveled through the clouds. Both were indecisive.

Such was the overall view of events, as Tolk related it to the humans an hour or so later. All that could be seen from the water was that the sky armies were separating. They hovered and wheeled, dizzyingly high overhead, two tangled masses of black dots against ruddy-tinged cloud banks. Doubtless threats, curses, and boasts were tossed across the wind between them, but there were no more arrows.

"What is it?" gasped Angrek. "What's happening up there?"

"A truce, of course," said Van Rijn. He picked his teeth with a fingernail, hawked, and patted his abdomen complacently. "They was making nowheres, so finally Tolk got someone through to Delp and said let's talk this over, and Delp agreed."

"But—we can't—you can't bargain with a Draka! He's not . . . he's *alien!*"

A growl of goose-pimpled loathing assent went along the weary groups of Lannachska.

"You can't reason with a filthy wild animal like that," said Angrek. "All you can do is kill it. Or it will kill you!"

Van Rijn cocked a brow at Wace, who stood on the deck above him, and said in Anglic: "I thought maybe we could tell them now that this truce is the only objective of all our fighting so far—but maybe not just yet, *nie?*"

"I wonder if we'll ever dare admit it," said the younger man.

"We will have to admit it, this very day, and hope we do not get stuffed alive with red peppers for what we say. After alls, we did make Trolwen and the Council agree. But then, they are very hard-boiled-egg heads, them." Van Rijn shrugged. "Comes now the talking. So far we have had it soft. This is the times that fry men's souls. Ha! Have you got the nerve to see it through?"

## XIX

Approximately one tenth of the rafts lumbered out of the general confusion and assembled a few kilometers away. They were joined by such ice ships as were still in service. The decks of all were jammed with tensely waiting warriors. These were the vessels held by Lannach.

Another tenth or so still burned, or had been torn and beaten by stonefire until they were breaking up under Achan's mild waves. These were the derelicts, abandoned by both nations. Among them were many dugouts, splintered, broken, kindled, or crewed only by dead Drak'honai.

The remainder drew into a mass around the admiral's castle. This was no group of fully manned, fully equipped rafts and canoes; no crew had escaped losses, and a good many vessels were battered nearly into uselessness. If the Fleet could get half their normal fighting strength back into action, they would be very, very lucky.

Nevertheless, this would be almost three times as many units as the Lannachska now held *in toto*. The numbers of males on either side were roughly equal; but, with more cargo space, the Drak'honai had more ammunition. Each of their vessels was also individually superior: better constructed than an ice ship, better crewed than a captured raft.

In short, Drak'ho still held the balance of power.

As he helped Van Rijn down into a seized canoe, Tolk said wryly: "I'd have kept my armor on if I were you, Eart'a. You'll only have to be laced back into it, when the truce ends."

"Ah." The merchant stretched monstrously, puffed out his stomach, and plumped himself down on a seat. "Let us suppose, though, the armistice does not break. Then I will have been wearing that bloody-be-smeared corset all for nothings."

"I notice," added Wace, "neither you nor Trolwen are cuirassed."

The commander smoothed his mahogany fur with a nervous hand. "That's for the dignity of the Flock," he muttered. "Those muck-walkers aren't going to think I'm afraid of them."

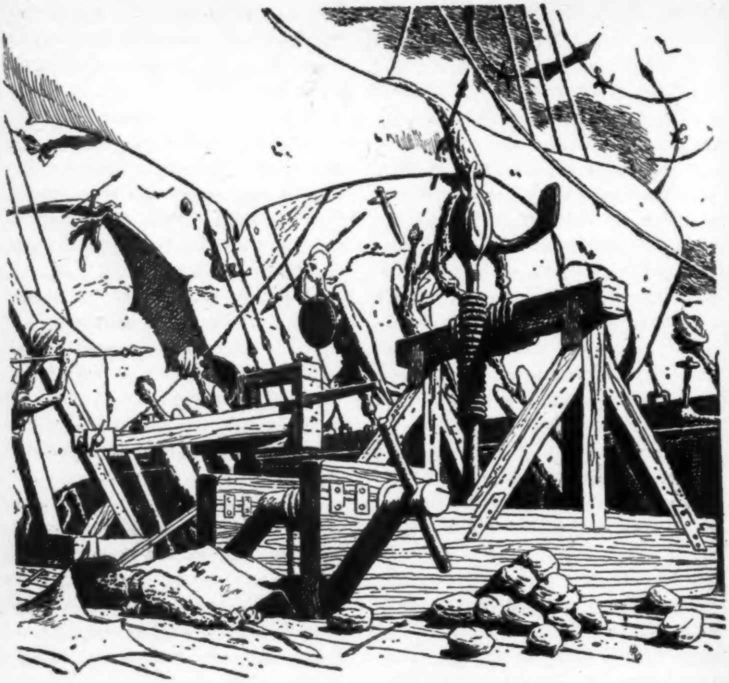
The canoe shoved off, its crew bent to the oars, it skipped swiftly over wrinkled dark waters. Above it dipped and soared the rest of the agreed-on Lannacha guard, putting on their best demonstration of parade flying for the edification of the enemy. There were about a hundred all told. It was comfortlessly little to take into the angered Fleet.

"I don't expect to reach any agreement," said Trolwen. "No one can—with a mind as foreign as theirs."

"The Fleet peoples are just like you," said Van Rijn. "What you need is more brotherhood, by damn. You should bash in their heads without this race prejudice."

"Just like *us*?" Trolwen bristled. His eyes grew flat glass-yellow. "See here, Eart'a—"

"Never mind," said Van Rijn. "So they do not have a rutting season.



So you think this is a big thing. All right. I got some thinkings to make of my own. Shut up."

The wind ruffled waves and strummed idly on rigging. The sun struck long copper-tinged rays through scudding cloudbanks, to walk on the sea with fiery footprints. The air was cool, damp, smelling a little of salty life. It would not be an easy time to die, thought Wace. Hardest of all, though, to forsake Sandra, where she lay dwindling under the ice cliffs of Dawrnach. *Pray for my soul, beloved, while you wait to follow me. Pray for my soul.*

"Leaving personal feelings aside," said Tolk, "there's much in the commander's remarks. That is, a folk with lives as alien to ours as the Drakska will have minds equally alien. I don't pretend to follow the thoughts of you Eart'ska: I consider you my friends, but let's admit it, we have very little in common. I only trust you because your immediate motive—survival—has been made so clear to me. When I don't quite follow your reasoning, I can safely assume that it is at least well-intentioned.

"But the Drakska, now—how can they be trusted? Let's say that a peace agreement is made. How can we know they'll keep it? They may have no concept of honor at all, just as they lack all concept of sexual decency. Or, even if they do intend to abide by their oaths, are we sure the words of the treaty will mean the same thing to them as to us? In my capacity of Herald, I've seen many semantic misunderstandings between tribes with different languages. So what of tribes with different instincts?

"Or I wonder . . . can we even trust ourselves to keep such a pledge? We do not hate anyone merely for having fought us. But we hate dishonor, perversion, uncleanliness. How can we live with ourselves, if we make peace with creatures whom the gods must loathe?"

He sighed and looked moodily ahead to the nearing rafts.

Wace shrugged. "Has it occurred to you, they are thinking very much the same things about you?" he retorted.

"Of course they are," said Tolk. "That's yet another hailstorm in the path of negotiations."

*Personally,* thought Wace, *I'll be satisfied with a temporary settlement. Just let them patch up their differences long enough for a message to reach Thursday Landing. (How?) Then they can rip each other's throats out for all I care.*

He glanced around him, at the slim winged forms, and thought of work and war, torment and triumph —yes, and now and then some laughter or a fragment of song—shared. He thought of high-hearted Trolwen, philosophic Tolk, earnest young Angrek, he thought of brave kindly Delp and his wife Rodonis, who was so much more a lady than many a human female he had known. And the small furry cubs which tumbled in the dust or climbed into his lap . . . *No,* he told himself, *I'm wrong. It means a great deal to me, after all, that this war should be permanently ended.*

The canoe slipped in between towering raft walls. Drak'ho faces looked stonily down on it. Now and then someone spat into its wake. They were all very quiet.

The unwieldy pile of the flagship loomed ahead. There were banners strung from the mastheads, and a guard in bright regalia formed a ring enclosing the main deck. Just before the wooden castle, sprawled on furs and cushions, Admiral T'heonax and his advisory council waited. To one side stood Captain Delp with a few personal guards, in war-harness still sweaty and unkempt.

Total silence lay over them as the canoe came to a halt and made fast to a bollard. Trolwen, Tolk, and most of the Lannacha troopers flew straight up to the deck. It was minutes later, after much pushing, panting, and swearing, that the humans topped that mountainous hull.

Van Rijn glowered about him.

"What for hospitality!" he snorted in the Drak'ho language. "Not so much as one little rope let down to me, who is pushing my poor old tired bones to an early grave all for your sakes. Before Heaven, it is hard! It is hard! Sometimes I think I give up, me, and retire. Then where will the galaxy be? Then you will all be sorry, when it is too late."

T'heonax gave him a sardonic stare. "You were not the best-behaved guest the Fleet has had, Eart'ho," he answered. "I've a great deal to repay you. Yes. I have not forgotten."

Van Rijn wheezed across the planks to Delp, extending his hand. "So our intelligences was right, and it was you doing all the works," he blared. "I might have been sure. Nobody else in this Fleet has so much near a gram of brains. I, Nicholas van Rijn, compliment you with regards."

T'heonax stiffened and his councilors, rigid in braid and sash, looked duly shocked at this ignoring of the admiral. Delp hung back for an instant. Then he took Van Rijn's hand and squeezed it, quite in the Terrestrial manner.

"Lodestar help me, it is good to see your villainous fat face again," he said. "Do you know how nearly you cost me my . . . everything? Were it not for my lady—"

"Business and friendship we do not mix," said Van Rijn airily. "Ah, yes, good Vrouw Rodonis. How is she and all the little ones? Do they still remember old Uncle Nicholas and the bedtime stories he was telling them, like about the—"

"If you please," said T'heonax in an elaborate voice, "we will, with your permission, carry on. Who shall interpret? Yes, I remember you now, Herald." An ugly look. "Your attention, then. Tell your leader that this parley was arranged by my field commander, Delp hyr Orikan, without even sending a messenger down here to consult me. I would have opposed it had I known. It was neither prudent nor necessary. I shall have to have these decks scrubbed where barbarians have trod. However, since the Fleet is bound by its honor—you do have a word for honor in your language, don't you?—I will hear what your leader has to say."

Tolk nodded curtly and put it into Lannachamael. Trolwen sat up, eyes kindling. His guards growled, their hands tightened on their weapons. Delp shuffled his feet unhappily, and some of T'heonax's captains looked away in an embarrassed fashion.

"Tell him," said Trolwen after a moment, with bitter precision, "that we will let the Fleet depart from Achan at once. Of course, we shall want hostages."

Tolk translated. T'heonax peeled lips back from teeth and laughed. "They sit here with their wretched handful of rafts and say this to us?" His courtiers tittered an echo.

But his councilors, who captained his flotillas, remained grave. It was Delp who stepped forward and said: "The admiral knows I have taken my share in this war. With these hands, wings, this tail, I have killed enemy males; with these teeth, I have drawn enemy blood. Nevertheless I say now, we'd better at least listen to them."

"What?" T'heonax made round eyes. "I *hope* you are joking."

Van Rijn rolled forth. "I got no time for fumblydiddles," he boomed. "You hear me, and I put it in millicredit words so some two-year-old cub can explain it to you. Look out there!" His arm waved broadly at the sea. "We have rafts. Not so many, perhaps, but enough. You make terms with us, or we keep on fighting. Soon it is you who do not have enough rafts. So! Put that in your pipe and stick it!"

Wace nodded. Good. Good, indeed. Why had that Drak'ho vessel run from his own lubber-manned prize? It was willing enough to exchange long-range shots, or to grapple sailor against sailor in the air. It was not willing to risk being boarded, wrecked, or set ablaze by Lannach's desperate devils.

Because it was a home, a fortress, and a livelihood—the only way to make a living that this culture knew. If you destroyed enough rafts, there would not be enough fish-catching or fish-storing capacity to keep the folk alive. It was as simple as that.

"We'll sink you!" screamed T'heonax. He stood up, beating his wings, crest aquiver, tail held like an iron bar. "We'll drown every last whelp of you!"

"Possible so," said Van Rijn. "This is supposed to scare us? If we give up now, we are done for anyhow. So we take you along to hell with us, to shine our shoes and fetch us cool drinks, *nie?*"

Delp said, with trouble in his gaze: "We did not come to Achan for love of destruction, but because hunger drove us. It was you who denied us the right to take fish which you yourselves never caught. Oh, yes, we did take some of your land too, but the water we must have. We can *not* give that up."

Van Rijn shrugged. "There are other seas. Maybe we let you haul a few more nets of fish before you go."

A captain of the Fleet said slowly: "My lord Delp has voiced the crux of the matter. It hints at a solution. After all, the Sea of Achan has little or no value to you Lannach'honai. We did, of course, wish to garrison your coasts, and occupy certain islands which are sources of timber and flint and the like. And naturally, we wanted a port of our own in Sagna Bay, for emergencies and repairs. These are questions of defense and self-sufficiency, not of immediate survival like the water. So perhaps—"

*"No!"* cried T'heonax.

It was almost a scream. It shocked them into silence. The admiral crouched panting for a moment, then snarled at Tolk: "Tell your leader . . . I, the final authority . . . I refuse. I say we can crush your joke of a navy with small loss to ourselves. We have no reason to yield anything to you. We may allow you to keep the uplands of Lannach. That is the greatest concession you can hope for."

"Impossible!" spat the Herald. Then he rattled the translation off for Trolwen, who arched his back and bit the air.

"The mountains will not support us," explained Tolk more calmly. "We have already eaten them bare—that's no secret. We must have the lowlands. And we are certainly not going to let you hold any land whatsoever, to base an attack on us in a later year."

"If you think you can wipe us off the sea now, without a loss that will cripple you also, you may try," added Wace.

"I say we can!" stormed Theonax. "And will!"

"My lord—" Delp hesitated. His eyes closed for a second. Then he said quite dispassionately: "My lord admiral, a finish fight now would likely be the end of our nation. Such few rafts as survived would be the prey of the first barbarian islanders that chanced along."

"And a retreat into The Ocean would *certainly* doom us," said Theonax. His forefinger stabbed. "Unless you can conjure the trech and the fruitweed out of Achan and into the broad waters."

"That is true, of course, my lord," said Delp.

He turned and sought Trolwen's eyes. They regarded each other steadily, with respect.

"Herald," said Delp, "tell your chief this. We are not going to leave the Sea of Achan. We cannot. If you insist that we do so, we'll fight you and hope you can be destroyed without too much loss to ourselves. We have no choice in that matter.

"But I think maybe we can give up any thought of occupying either Lannach or Holmenach. You can keep all the solid land. We can barter our fish, salt, sea harvest, handicrafts, for your meat, stone, wood, cloth, and oil. It would in time become profitable for both of us."

"And incidental," said Van Rijn, "you might think of this bit too. If Drak'ho has no land, and Lannach has no ships, it will be sort of a little hard for one to make war on another, *nie?* After a few years, trading and getting rich off each other, you get so mutual dependent war is just impossible. So if you agree like now, soon your troubles are over, and then comes Nicholas van Rijn with Earth trade goods for all, like Father Christmas my prices are so reasonable. What?"

"Be still!" shrieked Theonax.

He grabbed the chief of his guards by a wing and pointed at Delp. "Arrest that traitor!"

"My lord—" Delp backed away. The guard hesitated. Delp's warriors closed in about their captain, menacingly. From the listening lower decks there came a groan.

"The Lodestar hear me," stammered Delp, "I only suggested . . . I know the admiral has the final say—"

"And my say is, 'No.' " declared Theonax, tacitly dropping the matter of arrest. "As admiral and Oracle, I forbid it. There is no possible agreement between the Fleet and these . . . these vile . . . filthy, dirty, animal—" He dribbled at the lips. His hands curved into claws, poised above his head.

A rustle and murmur went through the ranked Drak'honai. The captains lay like winged leopards, still cloaked with dignity, but there was terror in their eyes. The Lannachska, ignorant of words but sensitive to tones, crowded together and gripped their weapons more tightly.

Tolk translated fast, in a low voice. When he had finished, Trolwen sighed.

"I hate to admit it," he said, "but if you turn that *marswa's* words around, they are true. Do you really, seriously think two races as different as ours could live side by side? It would be too tempting to break the pledges. They could ravage our land while we were gone on migration, take all our towns again . . . or we could come north once more with barbarian allies, bought with the promise of Drak'ho plunder— We'd be back at each other's throats, one way or another, in five years. Best to have it out now. Let the gods decide who's right and who's too depraved to live."

Almost wearily, he bunched his muscles, to go down fighting if T'heonax ended the armistice this moment.

Van Rijn lifted his hands and his voice. It went like a bass drum, the length and breadth and depth of the castle raft. And nocked arrows were slowly put back into their quivers.

"Hold still! Wait just a bloody minute, by damn. I am not through talking yet."

He nodded curtly at Delp. "You have some sense, you. Maybe we can find a few others with brains not so much like a spoonful of moldy tea sold by my competitors. I am going to say something now. I will use Drak'ho language. Tolk, you make a running translation. This no one on the planet has heard before. I tell you Drak'ho and Lannacha are *not* alien! They are the same identical stupid race!"

Wace sucked in his breath. "What?" he whispered in Anglic. "But the breeding cycles—"

"Kill me that fat worm!" shouted T'heonax.

Van Rijn waved an impatient hand at him. "Be quiet, you. I make the talkings. So! Sit down, both you nations, and listen to Nicholas van Rijn!"

## XX

The evolution of intelligent life on Diomedes is still largely conjectural; there has been no time to hunt fossils. But on the basis of existing biology and general principles, it is possible to reason out the course of millennial events.

Once upon a time in the planet's tropics there was a small continent or large island, thickly forested. The equatorial regions never know the long days and nights of high latitudes: at equinox the sun is up for six hours, to cross the sky and set for another six; at solstice there is a twilight, the sun just above or below the horizon. By Diomedean standards these are ideal conditions which will support abundant life. Among the species at this past epoch there was a small, bright-eyed arboreal carnivore. Like Earth's flying squirrel, it had developed a membrane on which to glide from branch to branch.

But a low-density planet has a queasy structure. Continents rise and sink with indecent speed, a mere few hundreds of thousands of years. Ocean and air currents are correspondingly deflected; and, because of the great axial tilt and the larger fluid masses involved, Diomedean currents bear considerably more heat or cold than do Earth's. Thus, even at the equator, there were radical climatic shifts.

A period of drought shriveled the ancient forests into scattered woods separated by great dry pampas. The flying pseudo-squirrel developed true wings to go from copse to copse. But being an adaptable beast, it began also to prey on the new grass-eating animals which herded over the plains. To cope with the big ungulates, it grew in size. But then, needing more food to fuel the larger body, it was forced into a variety of environments, seashore, mountains, swamps—yet by virtue of mobility remained interbred rather than splitting into new species. A single individual might thus face many types of country in one lifetime, which put a premium on intelligence.

At this stage, for some unknown reason, the species—or a part of it, the part destined to become important —was forced out of the homeland. Possibly diastrophism broke the original continent into small islands which would not support so large an animal population; or the drying-out may have progressed still further. Whatever the cause, families and flocks drifted slowly northward and southward through hundreds of generations.

There they found new territories, excellent hunting—but a winter which they could not survive. When the long darkness came, they must perforce return to the tropics to wait for spring. It was not the inborn, automatic reaction of Terrestrial migratory birds. This animal was already too clever to be an instinct machine; its habits were *learned*. The brutal natural selection of the annual flights stimulated this intelligence yet more.

Now the price of intelligence is a very long childhood in proportion to the total lifespan. Since there is no action-pattern built into the thinker's genes, each generation must learn everything afresh, which takes time. Therefore, no species can become intelligent unless it or its environment first produces some mechanism for keeping the parents together, so that they may protect the young during the extended period of helpless infancy and ignorant childhood. Mother love is not enough; Mother will have enough to do, tending the suicidally inquisitive cubs, without having to do all the food-hunting and guarding as well. Father must help out. But what will keep Father around, once his sexual urge has been satisfied?

Instinct can do it. Some birds, for example, employ both parents to rear the young. But elaborate instinctive compulsions are incompatible with intelligence. Father has to have a good selfish reason to stay, if Father has brains enough to *be* selfish.

In the case of man, the mechanism is simple: permanent sexuality. The human is never satisfied at any time of year. From this fact we derive the family, and hence the possibility of prolonged immaturity, and hence our cerebral cortex.

In the case of the Diomedean, there was migration. Each flock had a long and dangerous way to travel every year. It was best to go in company, under some form of organization. At journey's end in the tropics, there was the abandon of the mating season—but soon the unavoidable trip back home, for the equatorial islands would not support many visitors for very long.

Out of this primitive annual grouping—since it was not blindly instinctive, but the fruit of experience in a gifted animal—there grew loose permanent associations. Defensive bands became co-operative bands. Already the exigencies of travel had caused male and female to specialize their body types, one for fighting, one for burden-bearing. It was, therefore, advantageous that the sexes maintain their partnership the whole year around.

The animal of permanent family—on Diomedes, as a rule, a rather large family, an entire matrilineal clan—with the long gestation, the long cubhood, the constant change and challenge of environment, the competition for mates each midwinter with alien bands having alien ways: this animal had every evolutionary reason to start thinking. Out of such a matrix grew language, tools, fire, organized nations, and those vague unattainable yearnings we call "culture."

Now while the Diomedean had no irrevocable pattern of inborn behavior, he did tend everywhere to follow certain modes of life. They were the easiest. Analogously, humankind is not required by instinct to formalize and regulate its matings as marriage, but human societies have almost invariably done so. It is more comfortable for all concerned. And so the Diomedean migrated south to breed.

But he did not have to!

When breeding cycles exist, they are controlled by some simple foolproof mechanism. Thus, for many birds on Earth it is the increasing length of the day in springtime which causes mating: the optical stimulus triggers hormonal processes which reactivate the dormant gonads. On Diomedes, this wouldn't work; the light cycle varies too much with latitude. But once the proto-intelligent Diomedean had gotten into migratory habits—and therefore must breed only at a certain time of the year, if the young were to survive—evolution took the obvious course of making that migration itself the governor.

Ordinarily a hunter, with occasional meals of nuts or fruit or wild grain, the Diomedean exercised in spurts. Migration called for prolonged effort; it must have taken hundreds or thousands of generations to develop the flying muscles alone, time enough to develop other adaptations as well. So this effort stimulated certain glands, which operated through a complex hormonal system to waken the gonads. (An exception was the lactating female, whose mammaries secreted an inhibiting agent.) During the great flight, the sex hormone concentration built up—there was no time or energy to spare for its dissipation. Once in the tropics, rested and fed, the Diomedean made up for lost opportunities. He made up so thoroughly that the return trip had no significant effect on his exhausted glands.

Now and then in the homeland, fleetingly, after some unusual exertion, one might feel stirrings toward the opposite sex. One suppressed that, as rigorously as the human suppresses impulses to incest, and for an even more practical reason: a cub born out of season meant death on migration for itself as well as its mother. Not that the average Diomedean realized this overtly; he just accepted the taboo, founded religions and ethical systems and neuroses on it— However, doubtless the vague, lingering year-round attractiveness of the other sex had been an unconscious reason for the initial development of septs and flocks.

When the migratory Diomedean encountered a tribe which did not observe his most basic moral law, he knew physical horror.

Drak'ho's Fleet was one of several which have now been discovered by traders. They may all have originated as groups living near the equator and thus not burdened by the need to travel; but this is still guesswork. The clear fact is that they began to live more off the sea than the land. Through many centuries they elaborated the physical apparatus of ships and tackle, until it had become their entire livelihood.

It gave more security than hunting. It gave a home which could be dwelt in continuously. It gave the possibility of constructing and using elaborate devices, accumulating large libraries, sitting and thinking or debating a problem—in short, the freedom to encumber oneself with a true civilization, which no migrator had except to the most limited degree. On the bad side, it meant grindingly hard labor and aristocratic domination.

This work kept the deckhand sexually stimulated; but warm shelters and stored sea food had made his birthtime independent of the season. Thus the sailor nations grew into a very humanlike pattern of marriage and child-raising: there was even a concept of romantic love.

The migrators, who thought him depraved, the sailor considered swinish. Indeed, neither culture could imagine how the other might even be of the same species.

And how shall one trust the absolute alien?

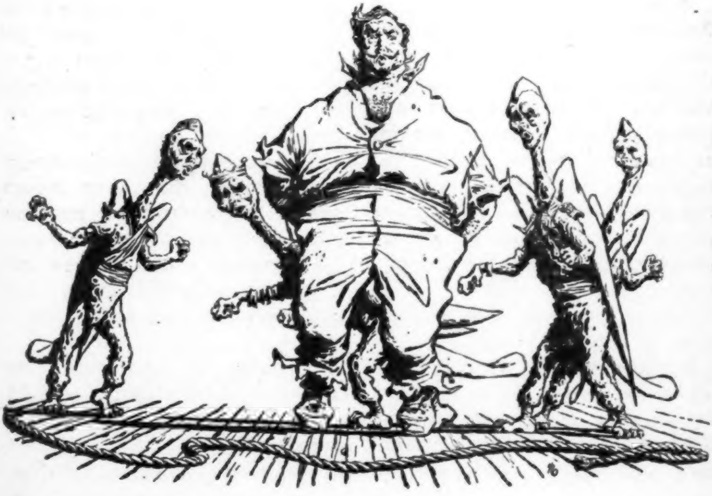
## XXI

"It is these ideological pfuities that make the real nasty wars," said Van Rijn. "But now I have taken off the ideology and we can sensible and friendly settle down to swindling each other, *nie?*"

He had not, of course, explained his hypothesis in such detail. Lannach's philosophers had some vague idea of evolution, but were weak on astronomy; Drak'ho science was almost the reverse. Van Rijn had contented himself with very simple, repetitious words, sketching what must be the only reasonable explanation of the well-known reproductive differences.

He rubbed his hands and chortled into a tautening silence. "So! I have not made it all sweetness. Even I cannot do that overnights. For long times to come yet, you each think the others go about this in disgusting style. You make filthy jokes about each other . . . I know some good ones you can adapt. But you know, at least, that you are of the same race. Any of you could have been a solid member of the other nation, *nie?* Maybe, come changing times, you start switching around your ways to live. Why not experiment a little, ha? No, no, I see you can not like that idea yet, I say no more."

He folded his arms and waited, bulky, shaggy, ragged, and caked with the grime of weeks. On creaking planks, under a red sun and a low sea wind, the scores of winged war-



riors and captains shuddered in the face of the unimagined.

Delp said at last, so slow and heavy it did not really break that drumhead silence: "Yes. This makes sense. I believe it."

After another minute, bowing his head toward stone-rigid T'heonax: "My lord, this does change the situation. I think—it will not be as much as we hoped for, but better than I feared— We can make terms, they to have all the land and we to have the Sea of Achan. Now that I know they are not . . . devils . . . animals— Well, the normal guarantees, oaths and exchange of hostages and so on —should make the treaty firm enough."

Tolk had been whispering in Trolwen's ear. Lannach's commander nodded. "That is much my own thought," he said.

"Can we persuade the Council and the clans, Flockchief?" muttered Tolk.

"Herald, if we bring back an honorable peace, the Council will vote our ghosts godhood after we die."

Tolk's gaze shifted back to T'heonax, lying without movement among his courtiers. And the grizzled fur lifted along the Herald's back.

"Let us first return to the Council alive, Flockchief," he said.

T'heonax rose. His wings beat the air, cracking noises like an ax going through bone. His muzzle wrinkled into a lion mask, long teeth gleamed wetly forth, and he roared:

"No! I've heard enough! This farce is at an end!"

Trolwen and the Lannacha escort did not need an interpreter. They clapped hands to weapons and fell into a defensive circle. Their jaws clashed shut automatically, biting the wind.

"My lord!" Delp sprang fully erect.

"Be still!" screeched T'heonax. "You've said far too much." His head swung from side to side. "Captains of the Fleet, you have heard how Delp hyr Orikan advocates making peace with creatures lower than the beasts. Remember it!"

"But my lord—" An older officer stood up, hands aloft in protest. "My lord admiral, we've just had it shown to us, they aren't beasts . . . it's only a different—"

"Assuming the Eart'ho spoke truth, which is by no means sure, what of it?" T'heonax fleered at Van Rijn. "It only makes the matter worse. We know beasts can't help themselves but these Lannach'honai are dirty by choice. And you would let them live? You would . . . would *trade* with them . . . enter their towns . . . let your young be seduced into their— No!"

The captains looked at each other. It was like an audible groan. Only Delp seemed to have the courage to speak again.

"I humbly beg the admiral to recall, we've no real choice. If we fight them to a finish, it may be our own finish too."

"Ridiculous!" snorted T'heonax.

"Either you are afraid or they've bribed you."

Tolk had been translating *sotto voce* for Trolwen. Now, sickly, Wace heard the commander's grim reply to his Herald: "If he takes that attitude, a treaty is out of the question. Even if he made it, he'd sacrifice his hostages to us—not to speak of ours to him—just to renew the war whenever he felt ready. Let's get back before I myself violate the truce!"

*And there,* thought Wace, *is the end of the world. I will die under flung stones, and Sandra will die in Glacier Land. Well . . . we tried.*

He braced himself. The admiral might not let this embassy depart.

Delp was looking around from face to face. "Captains of the Fleet," he cried, "I ask your opinion . . . I implore you, persuade my lord admiral that—"

"The next treasonable word uttered by anyone will cost him his wings," shouted T'heonax. "Or do you question my authority?"

It was a bold move, thought Wace in a distant part of his thuttering brain—to stake all he had on that one challenge. But of course, T'heonax was going to get away with it; no one in this caste-ridden society would deny his absolute power, not even Delp the bold. Reluctant they might be, but the captains would obey.

The silence grew shattering.

Nicholas van Rijn broke it with a long, juicy Bronx cheer.

The whole assembly started. T'heonax leaped backward and for a moment he was like a bat-winged tomcat.

"What was that?" he blazed.

"Are you deaf?" answered Van Rijn mildly. "I said—" He repeated, with tremolo.

"What do you mean?"

"It is an Earth term," said Van Rijn. "As near as I can render it, let me see . . . well, it means you are a—" The rest was the most imaginative obscenity Wace had heard in his life.

The captains gasped. Some drew their weapons. The Drak'ho guards on the upper decks gripped bows and spears. "Kill him!" screamed T'heonax.

"No!" Van Rijn's bass exploded on their ears. The sheer volume of it paralyzed them. "I am an embassy, by damn! You hurt an embassy and the Lodestar will sink you in hell's boiling seas!"

It checked them. T'heonax did not repeat his order; the guards jerked back toward stillness; the officers remained poised, outraged past words.

"I have somethings to say you," Van Rijn continued, only twice as loud as a large foghorn. "I speak to all the Fleet, and ask you ask yourselves, why this little pip squeaker does so stupid. He makes you carry on a war where both sides lose—he makes you risk your lives, your wives and cubs, maybe the Fleet's own surviving—why? Because he is afraid. He knows, a few years cheek by jowl next to the Lannach'honai, and even more so trading with my company at my fantastic low prices, things begin to change. You get more into thinking by your own selves. You taste freedom. Bit by bit, his power slides from him. And he is too much a coward to live on his own selfs. *Nie,* he has got to have guards and slaves and all of you to make bossing over, so he proves to himself he is not just a little jellypot but a real true Leader. Rather he will have the Fleet ruined, even die himself, than lose this prop-up, him!"

T'heonax said, shaking: "Get off my raft before I forget there is an armistice."

"Oh, I go, I go," said Van Rijn. He advanced toward the admiral. His tread reverberated in the deck. "I go back and make war again if you insist. But only one small question I ask first." He stopped before the royal presence and prodded the royal nose with a hairy forefinger. "Why you make so much fuss about Lannacha home lifes? Could be maybe down underneath you hanker to try it yourself?"

He turned his back, then, and bowed.

Wace did not see just what happened. There were guards and captains between. He heard a screech, a bellow from Van Rijn, and then there was a hurricane of wings before him.

Something— He threw himself into the press of bodies. A tail crashed against his ribs. He hardly felt it; his fist jolted, merely to get a warrior out of the way and see—

Nicholas van Rijn stood with both hands in the air as a score of spears menaced him. "The admiral bit me!" he wailed. "I am here like an embassy, and the pig bites me! What kind of relations between countries is that, when heads of state bite foreign ambassadors, ha? Does an Earth president bite diplomats? This is uncivilized!"

T'heonax backed off, spitting, scrubbing the blood from his jaws. "Get out," he said in a strangled voice. "Go at once."

Van Rijn nodded. "Come, friends," he said. "We find us places with better manners."

"Freeman . . . Freeman, where did he—" Wace crowded close.

"Never mind where," said Van Rijn huffily.

Trolwen and Tolk joined them. The Lannacha escort fell into step behind. They walked at a measured pace across the deck, away from the confusion of Drak'honai under the castle wall.

"You might have known it," said Wace. He felt exhausted, drained of everything except a weak anger at his chief's unbelievable folly. "This race is carnivorous. Haven't you seen them snap when they get angry? It's . . . a reflex— You might have known!"

"Well," said Van Rijn in a most virtuous tone, holding both hands to his injury, "he did not *have* to bite. I am not responsible for his lack of control or any consequences of it, me. All good lawyer saints witness I am not."

"But the ruckus—we could all have been killed!"

Van Rijn didn't bother to argue about that.

Delp met them at the rail. His crest drooped. "I am sorry it must end thus," he said. "We could have been friends."

"Perhaps it does not end just so soon," said Van Rijn.

"What do you mean?" Tired eyes regarded him without hope.

"Maybe you see pretty quick. Delp"—Van Rijn laid a paternal hand on the Drak'ho's shoulder—"you are a good young chap. I could use a one like you, as a part-time agent for some tradings in these parts. On fat commissions, natural. But for now, remember you are the one they all like and respect. If anything happens to the admiral, there will be panic and uncertainty . . . they will turn to you for advice. If you act fast at such a moment, you can be admiral yourself! Then maybe we do business, ha?"

He left Delp gaping and swung himself with apish speed down into the canoe. "Now, boys," he said, "row like hell."

They were almost back to their own fleet when Wace saw clotted wings whirl up from the royal raft. He gulped. "Has the attack . . . has it begun already?" He cursed himself that his voice should be an idiotic squeak.

"Well, I am glad we are not close to them." Van Rijn, standing up as he had done the whole trip, nodded complacently. "But I think not this is the war. I think they are just disturbed. Soon Delp will take charge and calms them down."

"But—*Delp?*"

Van Rijn shrugged. "If Diomedean proteins is deadly to us," he said, "ours should not be so good for them, ha? And our late friend T'heonax took a big mouthful of me. It all goes to show, these foul tempers only lead to trouble. Best you follow my example. When I am attacked, I turn the other cheek."

## XXII

Thursday Landing had little in the way of hospital facilities: an autodiagnostician, a few surgical and therapeutical robots, the standard drugs, and the post xenobiologist to double as medical officer. But a six weeks' fast did not have serious consequences, if you were strong to begin with and had been waited on hand, foot, wing, and tail by two anxious nations, on a planet none of whose diseases could affect you. Treatment progressed rapidly with the help of bioaccelerine, from intravenous glucose to thick rare steaks. By the sixth Diomedean day, Wace had put on a noticeable amount of flesh and was weakly but fumingly aprowl in his room.

"Smoke, sir?" asked young Benegal. He had been out on trading circuit when the rescue party arrived; only now was he getting the full account. He offered cigarettes with a most respectful air.

Wace halted, the bathrobe swirling about his knees. He reached, hesitated, then grinned and said: "In all that time without tobacco, I seem to've lost the addiction. Question is, should I go to the trouble and expense of building it up again?"

"Well, no, sir—"

"Hey! Gimme that!" Wace sat down on his bed and took a cautious puff. "I certainly am going to pick up all my vices where I left off, and doubtless add some new ones."

"You, uh, you were going to tell me, sir . . . how the station here was informed—"

"Oh, yes. That. It was childishly simple. I figured it out in ten minutes, once we got a breathing spell. Send a fair-sized Diomedean party with a written message, plus of course one of Tolk's professional interpreters to help them inquire their way on this side of The Ocean. Devise a big life raft, just a framework of light poles which could be dovetailed together. Each Diomedean carried a single piece; they assembled it in the air and rested on it whenever necessary. Also fished from it: a number of Fleet experts went along to take charge of that angle. There was enough rain for them to catch in small buckets to drink—I knew there would be, since the Drak'honai stay at sea for indefinite periods, and also this is such a rainy planet anyhow.

"Incidentally, for reasons which are now obvious to you, the party had to include some Lannacha females. Which means that the messengers of both nationalities have had to give up some hoary prejudices. In the long run, that's going to change their history more than whatever impression we Terrestrials might have made, by such stunts as flying them home across The Ocean in a single day. From now on, willy-nilly, the beings who went on that trip will be a subversive element in both cultures; they'll be the seedbed of Diomedean internationalism. But that's for the League to gloat about, not me."

Wace shrugged. "Having seen them off," he finished, "we could only crawl into bed and wait. After the first few days, it wasn't so bad. Appetite disappears."

He stubbed out the cigarette with a grimace. It was making him dizzy.

"When do I get to see the others?" he demanded. "I'm strong enough now to feel bored. I want company, dammit."

"As a matter of fact, sir," said Benegal, "I believe Freeman van Rijn said something about"—a thunderous *"Skulls and smallpox!"* bounced in the corridor outside—"visiting you today."

"Run along then," said Wace sardonically. "You're too young to hear this. We blood brothers, who have defied death together, we sworn comrades, and so on and so forth, are about to have a reunion."

He got to his feet as the boy slipped out the back door. Van Rijn rolled in the front entrance.

His Jovian girth was shrunken flat, he had only one chin, and he leaned on a gold-headed cane. But his hair was curled into oily black ringlets, his mustaches and goatee waxed to needle points, his lace-trimmed shirt and cloth-of-gold vest were already smeared with snuff, his legs were hairy tree trunks beneath a batik sarong, he wore a diamond mine on each hand and a silver chain about his neck which could have anchored a battleship. He waved a ripe Trichinopoly cigar above a four-decker sandwich and roared:

"So you are walking again. Good fellow! The only way you get well is not sip dishwater soup and take it easily, like that upgebungled horse doctor has the nerve to tell me to do." He purpled with indignation. "Does one thought get through that sand in his synapses, what it is costing me every hour I wait here? What a killing I can make if I get home among those underhand competition jackals before the news reaches them Nicholas van Rijn is alive after all? I have just been out beating the station engineer over his thick flat mushroom he uses for a head, telling him if my spaceship is not ready to leave tomorrow noon I will hitch him to it and say giddap. So you will come back to Earth with us your own selfs, *nie?"*

Wace had no immediate reply. Sandra had followed the merchant in.

She was driving a wheelchair, and looked so white and thin that his heart cracked over. Her hair was a pale frosty cloud on the pillow, it seemed as if it would be cold to touch. But her eyes lived, immense, the infinite warm green of Earth's gentlest seas; and she smiled at him.

"My lady—" he whispered.

"Oh, she comes too," said Van Rijn, selecting an apple from the fruit basket at Wace's bedside. "We all continue our interrupted trip, maybe with not so much fun and games aboard—" He drooped one little sleet-gray eye at her, lasciviously. "Those we save for later on Earth when we are back to normal, ha?"

"If my lady has the strength to travel—" stumbled Wace. He sat down, his knees would bear him no longer.

"Oh, yes," she murmured. "It is only a matter of following the diet as written for me and getting much rest."

"Worst thing you can do, by damn," grumbled Van Rijn, finishing the apple and picking up an orange.

"It isn't suitable," protested Wace. "We lost so many servants when the skycruiser ditched. She'd only have—"

"A single maid to attend me?" Sandra's laugh was ghostly, but it held genuine amusement. "After now I am to forget what we did and endured, and be so correct and formal with you, Eric? That would be most silly, when we have climbed the ridge over Salmenbrok together, not?"

Wace's pulse clamored. Van Rijn, strewing orange peel on the floor, said: "Out of hard lucks, the good Lord can pull much money if He chooses. I cannot know every man in the company, so promising youngsters like you do go sometimes to waste on little outposts like here. Now I will take you home to Earth and find a proper paying job for you."

If *she* could remember one chilled morning beneath Mount Oborch, thought Wace, he, for the sake of his manhood, could remember less pleasant things, and name them in plain words. It was time.

He was still too weak to rise—he shook a little—but he caught Van Rijn's gaze and said in a voice hard with anger:

"That's the easiest way to get back your self-esteem, of course. Buy it! Bribe me with a sinecure to forget how Sandra sat with a paintbrush in a coalsack of a room, till she fainted from exhaustion, and how she gave us her last food . . . how I myself worked my brain and my heart out, to pull us all back from that jailhouse country and win a war to boot— No, don't interrupt. I know you had some part in it. You fought during that naval engagement: because you had no choice, no place to hide. You found a nice nasty way to dispose of an inconvenient obstacle to the peace negotiations. You have a talent for that sort of thing. And you made some suggestions.

"But what did it amount to? It amount to your saying to me: 'Do this! Build that!' And I had to do it, with nonhuman helpers and stone-age tools. I had to design it, even! Any fool could once have said, 'Take me to the Moon.' It took brains to figure out how!

"Your role, your 'leadership,' amounted to strolling around, gambling and chattering, playing cheap politics, eating like a hippopotamus while Sandra lay starving on Dawrnach—and claiming all the credit! And now I'm supposed to go to Earth, sit down in a gilded pigpen of an office, spend the rest of my life thumb-twiddling . . . and keep quiet when you brag. Isn't that right? You and your sinecure—"

Wace saw Sandra's eyes on him, grave, oddly compassionate, and jerked to a halt.

"I quit," he ended.

Van Rijn had swallowed the orange and returned to his sandwich during Wace's speech. Now he burped, licked his fingers, took a fresh puff of his cigar, and rumbled quite mildly:

"If you think I give away sinecures, you are being too optimist. I am offering you a job with importance for no reason except I think you can do it better than some knucklebone heads on Earth. I will pay you what the job is worth. And by damn, you will work your promontory off."

Wace gulped after air.

"Go ahead and insult me, public if you wish," said Van Rijn. "Just not on company time. Now I go find me who it was put the bomb in that cruiser and take care of him. Also maybe the cook will fix me a little Italian hero sandwich. Death and dynamite, they want to starve me to bones here, them!"

He waved a shaggy paw and departed like an amiable earthquake.

Sandra wheeled over and laid on a hand on Wace's. It was a cool touch, light as a leaf falling in a northern October, but it burned him. As if from far off, he heard her:

"I awaited this to come, Eric. It is best you understand now. I, who was born to govern . . . my whole life has been a long governing, not? . . . I know what I speak of. There are the fake leaders, the balloons, with talent only to get in people's way. Yes. But he is not one of them. Without him, you and I would sleep dead beneath Achan."

"But—"

"You complain he made you do the hard things that used your talent, not his? Of course he did. It is not the leader's job to do everything himself. It is his job to order, persuade, wheedle, bully, bribe—just that, to make people do what must be done, whether or not they think it is possible.

"You say, he spent time loafing around talking, making jokes and a false front to impress the natives? Of course! Somebody had to. We were monsters, strangers, beggars as well. Could you or I have started as a deformed beggar and ended as all but king?

"You say he bribed—with goods from crooked dice—and blustered, lied, cheated, politicked, killed both open and sly? Yes. I do not say it was right. I do not say he did not enjoy himself, either. But can you name another way to have gotten our lives back? Or even to make peace for those poor warring devils?"

"Well . . . well—" The man looked away, out the window to the stark landscape. It would be good to dwell inside Earth's narrower horizon.

"Well, maybe," he said at last, grudging each word. "I . . . I suppose I was too hasty. Still—we played our parts too, you know. Without us, he—"

"I think, without us, he would have found some other way to come home," she interrupted. "But we without him, no."

He jerked his head back. Her face was burning a deeper red than the ember sunlight outside could tinge it.

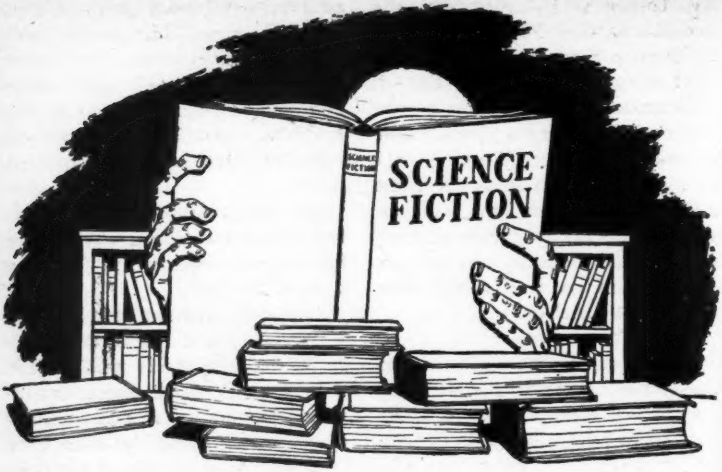
He thought, with sudden weariness: *After all, she is a woman, and women live more for the next generation than men can. Most especially she does, for the life of a planet may rest on her child, and she is an aristocrat in the old pure meaning of the word. He who fathers the next Duke of Hermes may be aging, fat, and uncouth; callous and conscienceless; unable to see her as anything but a boisterous episode. It doesn't matter, if the woman and the aristocrat see him as a man.*

*Well-a-day, I have much to thank them both for.*

"I—" Sandra looked confused, almost trapped. Her look held an inarticulate pleading. "I think I had best go and let you rest." After a moment of his silence: "He is not yet so strong as he claims. I may be needed."

"No," said Wace with an enormous tenderness. "The need is all yours. Good-by, my lady."

THE END



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## BY P. SCHUYLER MILLER

### LAW FOR THE PROPHETS

THERE has been a well established assumption in science fiction for quite a long time—implied, if not always spelled out—that human behavior, in bulk if not individually, is subject to some kind of natural law, and that this law or laws can be discovered and used to manipulate the present and future course of human civilization. Hence Asimov's Foundation; hence Heinlein's "Future History" (which Gnome is taking up where Shasta abandoned it); hence Van Vogt's stories of the Linn, now back in paper covers as "Empire of the Atom"; hence many, many more that you all know.

This is not just a madness of lazy SF writers, of course, no matter what the more critical wing may have to say. Toynbee's great—at least, massive—"Study of History" evolved and set down certain principles for the isolation, rise, and eventual collapse of civilizations. Spengler came before Toynbee. And there are others. There is, now, Professor C. Northcote Parkinson, Raffles Professor of History at the University of Malaya, who has brought an unusual combination of experience in military and public service, spread over forty-eight years and both hemispheres, to the elucidation of "Parkinson's Law" (Houghton Mifflin Co., Boston; 1957; 113+ xi pp.; $3.00).

Professor Parkinson is writing for our time and our civilization, but he is also writing for the future, and especially for the Asimovs of this world who are perhaps best suited of us all to project these axioms of human behavior upon the wide, curved, beaded, three-dimensional, stereotactual screen of the Galactic Future. Their deeper study of principles that are merely suggested here, on the basis of empirical formulation, may lead to modification of the Parkinson formulae, as they apply to men of the future and to non-men of any time. I am not at all sure, for example, that Parkinson's E/7 (H+45) key could be used with the Hokas, when trying to identify the most important clique at a cocktail party. In fact, I don't think it will work at a science-fiction convention, for the very basic reason that SF parties never seem to begin and certainly never end . . .

Since the question has come up so naturally, certain of Parkinson's laws, although derived for Imperial Cabinets and boards of industrial directors, do seem to apply to such smaller aggregates of human society as science-fiction clubs and conventions. Take the very first relationship that he has worked out in his little treatise, his Coefficient of Inefficiency. This formula clearly pinpoints the size of a committee-of-the-whole (which any SF club I've ever seen certainly is!), at which all hell breaks loose . . . nothing can be done . . . nobody likes nobody . . . cliques break out like hives in strawberry season . . . and blows are averted only because of indifference. The break-over comes between 19.9 and 22.4 rugged individual members "effectively present" (*op. cit.*, p. 12). Conversations develop among twos and threes all over the place. Anyone who wants to be heard, including the President, has to get up, pound the table, and shout. Once on his feet, he automatically makes a speech, committing himself and the group to as little as possible, as soon as possible. The politer, or more repressed members begin to exchange notes: in an SF group, these are likely to be pornographic limericks, the punch lines of dirty jokes, or only want-lists. They may be copies of magazines, SF or girlie.

Beyond an active membership of about twenty individualists, there is rapid fragmentation into "in" cliques, "out" cliques, fans vs. neo-fans, pros vs. everybody. Each of these groups, when it has developed a hard core of about five like-minded persons, takes on an identity of its own and starts the inevitable evolution to its own eventual "x."

Parkinson's Law of Triviality—Chapter 3—does and does not apply to such organizations. The law, simply stated, is that the time spent dealing with any item on the agenda of a meeting is inversely proportional to the amount of money involved. I think, to bring in clubs that have no money at all, that "work" may be taken as its equivalent. The club that will decide in ten minutes to take on a World Science Fiction Convention will spend half the night wrangling over who will go downstairs and reserve the meeting room for next month. The Board of Directors, even in the secure efficiency of its fiveness, can put in a good hour on whether to save sixteen cents by not sending postcard notices of the next meeting to eight people who skipped the last one.

There are other relationships in Professor Parkinson's handbook of social behavior, that should be put to good use by the boys who are constructing galactic federations and such clockwork. There is the relationship between the seediness of an institution and the elegance of its headquarters . . . the bureaucratic disease of "injelitance" (cf. intelligence) . . . and a good deal more, assembled from some very hightoned, very serious journals. In particular, there is the law that gives its name to the book: in any organization "work expands so as to fill the time available for its completion."

Put in another way, Parkinson's Law contains the secret of how seven men can do the work of one . . . and, with diligence and application, seventy can eventually take over what the seven have been doing. It's never been better visualized than in the November 4, 1957 issue of *Life,* in the double-page chart of United States Mis (sile) Management.

I've deliberately delayed finishing this introduction, to see what Moscow would turn up for the Grand Anniversary—a bull's-eye hit with a fusion bomb on the Moon—an unfortunate miss, promptly reported, that lands on New York or Washington instead —a "volunteer" to follow Laika: maybe even Zhukov. Nothing turned up: the all-night discussion at the Eastern States Archeological Federation meeting was more impassioned and fruitful than the news from the orbits, over Veterans' Day weekend. Of course, by the time this gets to you in the spring, something is bound to have happened. We may even have put up a satellite of our own—or called off the whole thing.

For the conclusion is pretty inescapable from this close distance that the reason we haven't an American sputnik in orbit is that nobody really wanted one. Nobody is a general word that must, in this application, be given a limited meaning: it's the Defense Department; it's the top military brass of all branches of the service; it's Congress; it's the President, and the advisors who call the Russian satellite a "silly bauble," and who obviously don't know or care about the difference between a rocket that goes straight up and comes down again, and one that goes up and stays.

We may have a certain responsibility for this, because Congressmen and generals and Cabinet members and Presidential aides have probably picked up a good few of their ideas about satellites from TV and Hollywood "science fiction," and have discounted the scientific values of the things as they have also discounted the values of science. Yet SF readers, by and large, have been neither shocked nor surprised: we've known for years that it would be done if someone really wanted to do it. One SF writer—"Lee Correy," otherwise G. Harry Stine—was fired by the chief contractor of the Vanguard project, for saying as much, and pointing out that Russia announced her satellite plans long ago, though few United States newspapers or magazines bothered to print the "propaganda release." I'm told he has landed on his feet, with a company making model rockets that have a better record than the big ones. They have to have, if kids are going to buy them. He also had two books on satellites on the shelves—one hard-cover and one paper-back—just before Sputnik I began beeping about how hot or cold it is up there.

These are two out of a tidal wave of satellite books that hit us this fall, just in time to be osbolete. Undoubtedly there are as many more, turned into waste paper or now being feverishly updated. The pity is that most of these books, for what they cover, are still as sound and useful as when they were written. From Arthur C. Clarke, for example, there was "The Making of a Moon" (*Harper; 205 pp.; $3.50*)—precisely the kind of thorough, comprehensive book that you can hand to someone who knows from nothing at all and wants to be filled in quickly. Clarke, as you might expect, covers more ground than any of the other writers, if in less detail. He tells you about satellites, instead of showing them to you. He also comments on such things as the legal aspects of space travel, the "satelloid" proposal for a powered satellite in an orbit inside the atmosphere, and a number of other points.

Shortest and handsomest of the satellite books is one for ages twelve to sixteen—"Exploring by Satellite," by Franklyn M. Branley (*Crowell; 42 pp.; $3.00*), and made outstanding by some gorgeous illustrations by a new artist, Helmut K. Wimmer of the Hayden Planetarium staff. This German born painter of deep space need step back for nobody—not even Chesley Bonestell. If your convention wants to exhibit satellite paintings, or your SF club sets up a satellite display in the local library, I'd try to get hold of the originals.

Charles Coombs' "Rockets, Missiles, and Moons" (*Morrow; 256 pp.; $3.75*) is also aimed at the younger teen-age group, and is sound in text—it's the author's third rocket book, and he knows what he's writing about—and very well illustrated with official photographs from many sources. But for your own young friends, who certainly don't need writing-down-to if they're asking about satellites, I'd suggest G. Harry Stine's "Rocket Power and Space Flight" (*Holt; 182 pp.; $3.75*)—with the proviso that you take time to read it yourself. And Stine has a paperback, "Earth Satellites and the Race for Space Superiority" (*Ace No. D-239; 191 pp.; 35¢* that you've undoubtedly owned ever since it came out. "Rocket Power" should be handed to the guy who is a little more serious than the one you gave Clarke's book: you'll find all the essentials of rockets and orbits spelled out and well illustrated, plus points—such as the vital part played by the shape of the constricted-neck "De Laval" rocket nozzle, or the characteristics of various liquid and solid fuels—that you won't find anywhere else. Stine was at White Sands, testing rockets, for a long time, and his intimate knowledge pays off. If you're an experimenter, there are hints and warnings for you, plus a list of other rocket clubs and a lot of other useful information.

If you can take your satellites as you have your SF, in an armchair, you'll still find something unusual in both of the Stine books: a detailed discussion of the building of a space station of the type proposed by a systems engineer for Goodyear Aircraft, Darrell Romick. It's spelled out best in the paperback, along with the author's own proposals for intermediate steps to space. You'll find him critical of the kind of designing done by certain noted, nameless, but easily identified rocket experts.

As for our own satellite program, I recommend Martin Caidin's "Vanguard!" (*Dutton; 288 pp.; $3.95*). This is a book that will give you just as graphic, you-are-there a picture of whatever has just happened or is going to happen as you read this, as if it had just come off the press. Caidin takes you to Cape Canaveral, right inside the Vanguard project, helped by more excellent photos. He fills you in on the background, from the V-2's and what we did with them to Vikings, Aerobees and Jupiters, and makes the engineering problems clear. He covers the scientific uses of a satellite clearly—the definitive book on which is "Scientific Uses of Earth Satellites," edited by James A. Van Allen and published in 1956 by the University of Michigan: 316 pages of technical papers, with plenty of math and statistics, for $10. And the book by Erik Bergaust and William Beller, "Satellite!," has been updated since its 1956 appearance and put between paper covers by Bantam (*No. A-1765; 176 pp.; 35¢.*) It's more timely than the original edition, but just missed the Russian exploit.

* * *

Here's more old news from Howard De Vore of Dearborn, Michigan: he begs me to tell you that the "Handbook of Science Fiction and

Fantasy," by Donald Tuck, the Tasmanian fan, was a clean sellout back in 1954. The Tuck handbook is now being rewritten, and will be a 400-page book, out late in 1958. No prices are available yet, and no orders can be taken, but if you're interested ask Howard to put you on the mailing list. His address is 4705 Weddel Street, Dearborn, Michigan.

SEA SIEGE, by Andre Norton. Harcourt, Brace & Co., New York. 1957.

Anyone who laments the loss of color and adventure from present-day science fiction, just isn't reading Andre Norton. The least violent of persons herself, she has a smooth way of handling violent action convincingly and grippingly. Her alleged juveniles are as adult as are Robert Heinlein's, and she tells a better story.

This book, basically, dovetails the theme of John Wyndham's "Out of the Deeps" ("The Kraken Wakes" in England) and a very different "On the Beach." An attack by intelligent octopi from the ocean's depths coincides with or may even have led to the dreaded all-out atomic holocaust in which East and West batter each other into smoking radioactive flinders. But where Wyndham's book had a typically English underplayed remoteness, "Sea Siege" plunges us right into the midst of things.

Young Griff Gunston, the hero, is on the West Indian isle of San Isadore, where his father has a marine research station and the United States Navy begins to build a secret base. The islanders are wonderfully done, and so is the subsea life. Into an already tense situation are injected a pair of sea monsters, a series of marine mysteries, a seismic shakeup that sinks the island's one city at the moment a volcano rises out of the nearby sea, news of the atomic armageddon that may have triggered all this, and the siege of the giant, monster-riding octopi. And the way Man stands up to all this is vastly more convincing than the Nevil Shute novel, with its picture of the human race quietly, dazedly walking to its own funeral.

This is what we've been missing in modern science fiction. We don't see much of Andre Norton in the magazines, but surely someone else can follow her example with the same subtlety, without falling back on pure thud-and-blunder hokum.

EARTHMAN'S BURDEN, by Poul Anderson & Gordon Dickson. Gnome Press, New York. 1957. 185 pp. $3.00

When some future World Science Fiction Convention, shaken by lack of sleep and no lack of bourbon, is hacking away at the immortal reputation of Ray Palmer, the irrefutable fact that he launched the Shaver Mystery on us should be more than offset by his discovery and sponsorship of the Hokas. That these furry, indomitable chunks of misdirected energy have left the quiet harbor of *Other Worlds* and *Universe,* and gone out to wider conquests . . . but let's not get maudlin. Let's enjoy "Earthman's Burden" and wait for the next reports from Plenipotentiary Alexander Braithwaite Jones.

The six Hoka misadventures here assembled cover eleven years of Jones' anything but tranquil career as rediscoverer and guide of the Class D folk of the planet Toka. When he meets them, a castaway Ensign in the United States Space Navy, they are reacting with Hokan thoroughness to a diet of old Western films: they're cowboys, and their hereditary, reptilian foes the Slissii, are Greenskin Indians. When Jones, not entirely by statesmanship, solves this dilemma in true Lone Rider fashion, he is immediately plunged into a diplomatic adventure involving two beautiful, willing women, a jealous administrator, a statue of John W. Campbell—a small corps of Hokas deep in the enactment of their first opera, "Don-giovanni."

These hapless, rollicking tales have all the subtlety of Laurel and Hardy, but they have enough variety, and have been hitched together deftly enough with a series of official dispatches, that they don't pall. The Hokas creating a Space Patrol and capturing a battleship . . . a Hokan Sherlock Holmes deep in the adventure of the Misplaced Hound (of the Baskervilles), with Jones as a bewildered Watson . . . a sea overrun with Hokan pirates, and Jones in a green beard . . . and a Hokan Foreign Legion rescuing Jones' bride (albeit of some years' standing) from a bloodthirsty lot of neighbors who slaughter each other with mousetraps, rubber balls, and poisoned tiddlywinks.

More than these few adventures might have been too many, but a secret dispatch on the last page promises that there is more to come after what passes, in Hokan (and Gnomish) circles for a discreet interval. And for very good measure, Marty Greenberg has brought Edd Cartier back as the only SF artist with any right to draw Hokas . . . though I'd have preferred scenes to the rather emblematic posters he's given us. And you can probably get the book at well under the list price through the "Pick-a-Book" plan that's been advertised here from time to time.

---

PEOPLE MINUS X, by Raymond Z. Gallun. Simon and Schuster, New York. 1957. 187 pp. $3.00

Raymond Z. Gallun was one of the most prolific writers in the early days of science fiction, and one whom I was forever confusing with his neighbor—as neighbors go in the open spaces of Wisconsin and Minnesota—Clifford D. Simak. This book does justice to his lively imagination, but it somehow fails to add up to much but a disappointment. For this, the publishers may be responsible to a degree: I suspect that they wanted the same kind of ethical dilemmas raised as in Jack Williamson's "Humanoids," with more confusion resulting than anything.

This is another version of the human-android war. When an attempt to develop a faster-than-light drive blows up the Moon and cooks most of the moonward section of humanity, Ed Dukas and his mother naturally suffered from the fact that his uncle was an originator of the process. He also had a hand in the vitaplasm, the synthetic flesh in which the dead could be recreated in their survivors' memories, "better" than new. So Ed became a target for the hatred that grew up among the natural people and the androids alike. Then, for reasons that are never very clear, he is summoned by his uncle down into near-microscopic smallness, where he lives off obscure energies, rides the air currents with better navigating ability than he could have flown a plane, assassinates enemies by traveling through their vitals, and resolves the whole conflict far too easily.

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THE TIME DISSOLVER, by Jerry Sohl. Avon Books, New York. T-186. 1957. 158 pp. 35¢

This original paperback is Jerry Sohl's best book since "The Haploids," and maybe the best he's done. Also, it has very little science in it except for the gimmick or device that takes eleven years out of the hero's life, and the lusting-for-power bureaucratic scientist who is responsible.

Walter Sherwood wakes up in a California motel, in bed with a girl he has never seen before, carrying the papers of a man who doesn't exist, but with total recall of his own life up to a moment eleven years before. He sets out to fill in the missing years, and presently we discover that the girl—his wife—has a similar lapse, and is doing the same thing. Eventually their probing brings them together again in the Michigan town where they had both worked for a mysterious foundation. And there they come up against a stone wall of silence.

It's deftly done, and makes a fast-moving mystery, but that is basically what the book is: the science is a mechanism to explain away the amnesia and motivate the villain. If you don't object, I know I don't.

---

HIDDEN WORLD, by Stanton A. Coblentz. Avalon Books, New York. 1957. 224 pp. $2.75

In 1935, when the serial version of this book appeared in *Wonder Stories* as "In Caverns Below," Stanton A. Coblentz was supposed to be the Great Satirist of science fiction—another Swift, at the least. He laid into the foibles of our society with a heavy hand and biting ridicule, but it seems incredible now that we can ever have considered this good. I guess we've matured a lot in more than twenty years . . .

It's the old, old formula that Swift used effectively in "Gulliver's Travels," in spite of the coarseness of his age, and that is overdone here to the point of being silly. Two mining engineers fall through the bottom of a mine in an earthquake, and wind up in a subterranean world inhabited by a race of albinos with the caste system, economy of waste, artificially motivated warfare, standards of idleness and false beauty, and just about everything else that can be packed into the situation. If *Mad* were to lampoon "Li'l Abner" satirizing "Dick Tracy" it would be more subtle than this.

---

Citizen of the Galaxy, by Robert A. Heinlein. Charles Scribner's Sons, New York. 1957. 302 pp. $2.95

I certainly needn't tell you much about this latest Heinlein novel, which was serialized here last fall. I haven't compared the book and the serial line for line, but there's little or no difference that shows in a casual run-through of the first three installments.

This is again published as a juvenile, for teen-agers, and I think it is the least likely of the whole Scribner's series—now eleven books in all—to appeal to young people. If Thorby had fought out his cause entirely in the setting of the slave world, or if he had been allowed to really become one of the People—the Free Traders on whom Heinlein has lavished all his loving diligence in this book—it might have hung together better. But the Rudbek of Rudbek sector does nothing but tie up the plot and afford some more contrasts in culture patterns. It's enjoyable to me, but will it be to a novice at SF? I'm still recommending the earlier books, like "The Rolling Stones," "Farmer in the Sky," "Starman Jones" to people who want good science fiction for a teen-age reader.

By the way, is Dr. Margaret Mader a portrait of Dr. Margaret Mead? Her AAAS address of December '56, before Phi Beta Kappa, finally saw print in *Science* for November 8, '57. This is the one called "Towards More Vivid Utopias," in which Dr. Mead castigates SF writers for portraying future heavens and hells, and failing to project a probable future society.

---

Atlas Shrugged, by Ayn Rand. Random House, New York. 1957. 1168 pp. $6.95

If I had used this book as the peg on which to hang this month's column, as I originally intended, the title would have been: "Ayn Rants." If you want to pay for a sermon, longer than anything since Puritan days, your seven dollars will do more good in a church collection basket or a Salvation Army tambourine, or even, I guess, supporting the Society for the Propagation of Voodoo.

Mainline science-fiction writers are amateurs, in both usual senses of that automatically double-entendred word, and in any third, fourth or other manifestations you can concoct. They write science fiction because they like the stuff, and most of them are self taught. Murray Leinster is the only *real* pro who still makes a major contribution to SF, and he was doing it about as early as he was writing his other, better paying stuff.

Since we're one big happy family, we've evolved rules of our own for our kind of society, and the fans don't really raise hell in the mail or at meetings unless someone steps outside and pretends fiction is fact. Because our "world" is farther removed from reality than, say, the world of the mystery reader/writers, our house rules may be a little more artificial and arbitrary. We understand them, and work with them, but it's rare for a rank outsider to blunder in and use a SF theme without showing himself up as a rank greenhorn, and distinctly *not* a Sense 1 amateur. But they keep on trying, because we have a richly rewarding field here, and now and then there's an Aldous Huxley, or George Orwell, or Olaf Stapledon, or Pat Frank. More often there are Ayn Rands.

As it happens, just about the time the book appeared, Bob Leman was complaining in the fanzine, *Inside,* that science fiction has gone conformist—left-liberal conformist. He was calling for a book in which the hero would be a good, hard-headed capitalist fighting against a union-dominated world society . . . or one ruled by vicious eggheads . . . or one in which the rediscovery of free enterprise rescues the world from socialist uniformitarianism. It's not really an answer to his plea, because it hasn't come from one of us, but "Atlas Shrugged" is just about all of these at once. And it could have been a very good book, at a third the length, with a tenth the repetition, and with a little Heinleinian loving-care spent on plausibility.

This is the story of a future—some time in our own century, I'd say—in which America's core of competent thinkers and workers simply go on strike against the society of "looters" and "planners" in which they, and we, live. We're shown a society to which Gresham's law has been applied, so that there is an accelerated down-grading of everything good to the level of the mediocre. Laws are made and rewards allotted on the basis of need, not of worth and performance: the businessman who succeeds because of his own brains and hard work—his competence—must turn over his inventions and most of his business to competitors who can't get it through their heads that bolts need nuts. Business is corrupt; labor is corrupt; education is corrupt; government compounds the corruption of them all, since it is jockeyed and swayed by them all.

We watch the collapse of the world over the shoulder of Dagny Taggart, the young woman who singlehanded is holding together the nation's greatest railroad network. Here is the really good part of the book, for Miss Rand has worked hard on getting the "feel" of running a railroad, as she did in getting the architectural background for her earlier, much acclaimed novel, "The Fountainhead." Dagny's brother, president of the Taggart line, is one of the loosemouthed, slack-jawed, pudgy-fleshed looters. Then there's Hank Reardon, metal magnate, whose Reardon Metal is the super-invention that any SF novel needs (there are rays, invisibility and other gimmicks, too). There is Francisco d'Anconia of Anconia Copper, the Argentine playboy who was Dagny's childhood pal and first lover. There is Ragnar Danneskjold, the modern pirate who steals from the worthless poor to reward the noble rich. And there is John Galt, who slowly grows from a myth to a reality, when Dagny at last discovers his plot to withdraw the world's best and most productive brains from circulation, let society collapse in its own corruption—with a fair amount of shoving at the right moments—and then come down out of the Colorado mountains to rebuild the world.

The author has a philosophy and a bone to pick with the way the world is going, and she has every right to rant against it in fictional form. My only complaint is that she does it so unevenly, and most of the time so crudely. There is no feeling whatever for the rest of the world—or for anything except New York and Colorado—except statements and inferences that it has crumpled into a swarm of "People's States" that are Communist or welfare or both: we're supporting them by the sweat of our taxes. There is absolutely no suggestion that atomic power plays any part in this highly developed industrial society, or that it has ever even existed: presumably, Miss Rand started working on her book before Hiroshima and didn't bother to up-date it. The Good Guys are all tall, erect, muscular, blue-eyed blonds, and the Bad Guys are as corrupt and flabby in body as in mind and character. The time allowed for total collapse—concrete roads grown up to weeds, factories obliterated, people grown so degenerate that they can't recall their life of two or three years before—is inadequate and unrealistic.

And everyone preaches and preaches and preaches. You're told over and over, by everyone worth his salt, what is wrong with the world, and you hear the *status quo* defended over and over by the no-goods who run things. All this reaches a kind of climax in a sixty-page speech by John Galt—the noble hero who just has to take the girl away from the much more interesting and alive Hank Reardon—which has all the exasperating and deadening effects of any filibuster.

If Miss Rand were willing to meet the special demands of this kind of story—if she weren't blinded by her own bile against income tax, social security, public housing, foreign aid, and what have you—she has the skill to write the book Bob Leman asked for. As it is, I doubt that you'll even want the remainders, at the price they'll have to charge. Watch the secondhand stores for a mint copy, with jacket, that someone just could not get through. I rented mine.

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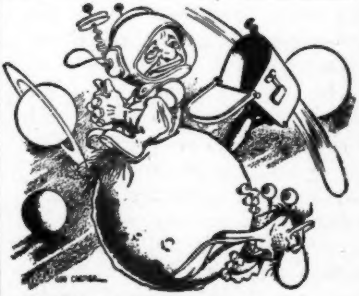
EARTH IS ROOM ENOUGH, by Isaac Asimov. Doubleday & Co., Garden City. 1957. 192 pp. $2.95

Earth is by no means room enough to contain the unbounded, if bounding imagination of Isaac Asimov. And in spite of the fact that the fifteen stories and two Gilbertian ballads in this collection all have their roots on this planet, they prove my thesis and belie the title by wandering all over time and fancy, and in and out of some ten magazines and a flock of newspapers.

One of the lot, the opener, "The Dead Past," was here in 1956. It points out some of the sociological consequences of the presumably harmless pastime of time-spying—looking in on other eras, instead of visiting them bodily. "Franchise" shows us a future in which one computer-selected voter settles the election issues of the entire nation. "The Watery Place" is a little vaudeville item with a bumbling sheriff and the man from a flying saucer. "Living Space" offers a solution to our eventual overcrowding, that's not quite as good an answer as it seems. "The Message" is a time-travel yarnlet—two pages—of which no more can be said without spilling beans.

Still sifting out the SF, "Satisfaction Guaranteed" is one of the new cycle of positronic robot stories, in which the Laws of Robotics are getting a new shaking up. I'm sure we can expect a book soon: "We, Robot"? "The Fun They Had" and "Someday" are very nice little commentaries on mechanized education, and "Jokester" is one of the stories that a number of people wrote and sold practically simultaneously, to explain where jokes come from. This is the best of them all. Best of this book, though, is the closing story, "Dreaming is a Private Thing," in which a slightly modified future is realized as fully as Heinlein ever did.

There remain some frank fantasies, and two rollicking ballads on the problems of a science-fiction author, written with slight apologies to the specter of W. S. Gilbert—the printer moved one acknowledgment to a story that would probably have bewildered the good gentleman. "Kid Stuff" is borderline—if you'll believe that elves were an insect race that dominated Earth in the far past. "Gimmicks Three" is a nice, if not too puzzling, cross between the pact-



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with-a-demon and a locked-room mystery. "The Last Trump" looks in on the Day of Judgment from an angle that only Asimov—or maybe Mark Twain—would select. In "The Immortal Bard" an after-dinner gag is good for three pages—and "Hell Fire" looks straight into the fireball of the ultimate bomb.

Judgment: Ike has more fun than people.

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## COMING AROUND AGAIN—

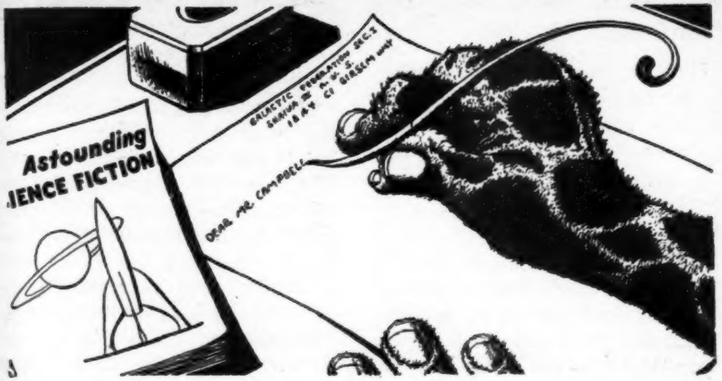
BEACHHEADS IN SPACE, edited by August Derleth. Berkley Books, No. G-77. 190 pp. 35¢. Seven of the stories in the original 1952 anthology: Del Rey, Asimov, Van Vogt, Russell, Wandrei, Wyndham, Bond. Old and familiar by now.

FAMOUS SCIENCE FICTION STORIES, edited by Raymond J. Healy & J. Francis McComas. Modern Library, No. G-31. 997+xvi pp. $2.95. "Adventures in Time and Space," which your vote in 1956 rated still the top book in Everyman's SF library, has now achieved the immortality of becoming a Modern Library Giant. The original collection appeared in 1946; later editions were, for some reason, cut by the publisher, but this is complete and has a new introduction. It is, as might be expected, appreciative of this magazine and its editor, who supplied all but three of the thirty-five contributions: thirty-four stories, with one article on the V-2 by—of course—Willy Ley. Here is the "Golden Age" you've been hearing about, in one fat, cheap volume. So buy it!

DOUBLE STAR, by Robert A. Heinlein. Signet Books, No. S-1444. 159 pp. 35¢. Here, and in hard covers, in 1956. Of course it's good, but why won't someone put Heinlein's even better "juveniles" into pb's? (Because they sell well enough as is, I suppose.)

HELL FLOWER, by George O. Smith. Pyramid Books, No. G-298. 160 pp. 35¢. Pyor melodrammer, handsomely turned out (first time in '53).

THE END



# BRASS TACKS

Dear Mr. Campbell:

I have been a loyal reader and subscriber to Astounding since 1951 but this is my first letter. It is self-evident that I enjoy the magazine very much. Being a Junior at Polytechnic Institute of Brooklyn, I have come in contact with Finnagle's Laws, which is what prompted my letter.

First I would like to dispel a common misconception about Finnagle's Variable Constant. Many think it is an abstract concept; it is, however, very concrete. It may be defined as the quotient:

$$\frac{\text{The Correct Answer}}{\text{Your Answer}} = F_e$$

or in other words, that number which, when multiplied by your findings yields the correct answer. As one of Dr. Finnagle's—he must be a Doctor to be so well known—Laws doubtless developed while he was a student, I propose:

"In any problem, if you find yourself doing a transfinite amount of work, the answer can be obtained by inspection."

Dr. Finnagle was also the first to use in lab The Perfect Inductor, Resistor, and Capacitor; The Linear Spring, and The Frictionless Surface. He also invented the Rubber Slide Rule for exact calculations.

I look forward to seeing in Astounding the full set of the Good Doctor's Laws.—Leonard E. Forman, Jr., 67-44—183rd Street, Fresh Meadows 65, New York.

*Finnagle never tried reading manuscripts! What happens when you find yourself doing a transfinite amount of inspection?*

---

Dear Sir:

You will, of course, be only too familiar with the large number of reports which have been chronicled regarding the sighting of flying saucers. In some cases it has been suggested that landings have been made and that communication has been established with the occupants. In nearly all cases these visitations have been ascribed to extraterrestrial beings, in some instances emanating from within our own solar system; in other cases it has been suggested that they come from elsewhere in the Universe. In the majority of cases great stress has been laid upon the speed at which these objects travel and with which they disappear.

Surely the explanation of these phenomena is quite simple. We feel that a false assumption has been made and that observers have fallen into error in attributing "flying saucer" activity to aliens. If you consider the matter objectively, it becomes apparent that these are not examples of travel in space, but in time. In other words these are our descendants looking back in order to trace their history and development. The duration of our own recorded history and the number of occasions during it when sightings have been made tend to confirm this explanation.

The speed of travel and the rate of disappearance can also be accounted for when you consider that these objects not only move in our space but in our time, both inter-related. The difficulties of photography and non-multiple sightings of the same object are also capable of explanation.

Manifest also is the reason why no actual landing has been made or communication established. If our descendants were to do either of these things, a dangerous paradox could be created which might well affect the future, even of the particular occupants of the saucer which created the paradox!—H. Warncken, Staines, Middlesex, England.

*If someone too busy looking at a flying saucer gets in the way of an automobile whose driver is similarly occupied—would the saucer become nonexistent, thus uncausing the accident?*

---

Dear John:

I have just read Sprague de Camp's letter in the January 1958 issue concerning the anti-intellectualism in countries other than the United States and I'm not sure that he has made a compelling case.

The examples of European anti-intellectualism which he has cited are, all but one, cases of political vengeance, or military, with the anti-intellectual aspects quite a side issue.

Lavoisier was guillotined for his activities as a tax-farmer; Priestley's home was burnt because he was a French sympathizer at a time when France was "the enemy"; Bruno and Serveto were burned—along with countless others—for holding unpopular religious opinions; the Russian geneticists were mistreated for maintaining "x" when the official opinion was "y." The Parthenon was exploded, the Louvain libraries burnt et cetera, et cetera, as the inevitable consequences of war. The Nazis were, of course, avowedly anti-intellectual, but this was not only an aberration of the general German attitude, both before and after the Nazis, but it involved them in as immediate and direct a retribution as the world has ever seen. Had Fermi, Einstein, Teller, Meitner et cetera, et cetera, stayed put—or been allowed to stay put—in the Axis countries, Germany might have had the atom bomb first.

American anti-intellectualism is not this sort of thing, at all. Some of our scientists have received their lumps for possessing unpopular political opinions, or being *said* to have them, but that is a relatively minor point. In America alone, of all the "advanced" nations, is there an anti-intellectual tradition among the common man. It is an article of folklore with us that the farmer is superior in virtue and morals to the city-slicker; that there is something ennobling about being born in a log cabin and being self-schooled; that there is something trustworthy about a Congressman who uses bad grammar; that a political candidate who uses big words is an egghead who should be avoided; that native horse-sense is superior to a college education; that the attic inventor is superior to the cloistered academician; the school of hard knocks is more important than Harvard; that you can judge a man's worth by the money he makes rather than by the degrees he owns; that teacher's pets are unbearable sneaks while the hookey-player is a *real* boy; that intelligent people are squares, snobs, long-hairs, not hep, not with it, and queers; that college consists of handsome boys and beautiful girls who are always in danger of flunking their exams, and of cave-chested pipsqueaks with glasses and horsy flat-chested spinsters with glasses who get straight A's but are comic figures; that scientists are mad, cold, self-centered, humorless, absent-minded, out of this world—in a bad sense—characters.

Perhaps other countries have similar stereotypes, but if they do, they don't have our effective mass-entertainment vehicles with which to spread them.

In short, let's put it this way. European anti-intellectualism consists of shooting a man with wrong political opinions even if he has brains. American anti-intellectualism, on the other hand, consists of distrusting a man who has brains even if he has the right political opinions.—Isaac Asimov.

*I agree with Ike's distinction; the American anti-intellectualism is* *different. However, I'll add a problem: Generally, if a large number of human beings agree on something, there is an important truth underlying the agreement. This does not mean that their belief is exactly true, but that, like legends, it is the somewhat distorted shadow of an important truth. The only way to deflate the bugaboo shadow, however, is to find the exact and valid truth behind it.*

*So . . . what is the truth behind the American feeling against academic intellectualism?*

---

Dear Sir:

The two most recent speeches by the President triggered by Sputniks essay a statement of the problems involved. His enumeration of the brighter phases of the situation left out one basic factor. His analysis of an approach to a solution of the problem avoided another area of reality of which he may be unaware or which he too heavily discounts.

American science, invention and engineering have not in the past come from government edict to produce: they came from the grass roots of American ingenuity, curiosity, brash intelligence and daring. There can be little doubt that the present state of development in the automobile, radio, and television has been greatly influenced by the hams. The uneducated country boy, Farnsworth, came up with some hard-to-believe ideas about television. He got those ideas in the semi-arid—scientific—region of central Utah.

Material in the newspapers leads me to believe that the military—or bureaucratic—classification of information serves best to keep the potential of American thinking from attacking the problems of rocketry, et cetera. Certainly it has not kept the Russians from knowing more about what we are doing than we do ourselves.

The worm's-eye-view from here seems to indicate that instead of a ten-year period of government sponsored and directed education plus billions of expenditures by a few groping, uncommunicative, trussed individuals, an intelligent presentation of the problems to the minds of America might surprise those people most likely to extoll the benefits of a free society.

Take the iron curtain from around our problems and watch American initiative and ingenuity go to work. When American youth can see some reason to dig into theoretical abstractions, theoretical abstractions will become their meat.—Homer Liddell, 3504 Penwood, Houston, Texas.

*Agreed that the situation is as you say. Now—come up with a method to change that situation!*

---

Gentlemen:

The story in your Astounding Science Fiction — June 1957 — titled "And Still It Moves," by Eric Frank Russell, on pages 122-123 describes

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Dr. X et cetera as "the late Leonard Keane Hirshburg.

Since I'm he and not yet "late," various colleagues—much younger to be sure—suggested that if the printed statement were—was?—true, why am I greeting everyone in such a cheerful, lively manner.

The account was otherwise a partially correct narrative of my investigation of that old fraud in black bombazine, Eusapia Pallidino. Theodore Dreiser, Henry L. Mencken, and the other university representative, and I brought together by Herewad Carrington were to be gullible professorial "patsies" to be used as innocent propagandists by Carrington.

He, she, and her Italian fellow "mediums(?)" just didn't get away with it. But this is another story. Now, in my eighty-first year—January 9, 1877 birth—I was then, November 19, 1909, thirty-two years of age.—Leonard Keane Hirshburg.

*In the famous words of Mark Twain, "The reports of my death are greatly exaggerated."*

---

Dear Mr. Campbell:

How does one go about collecting a set of Unwritten Laws?—D. F. Wiesen, 203 West 90th Street, New York, N. Y.

*It can be done only by anthropologists and science-fiction magazines!*

---

Dear Mr. Campbell:

Here are the nine Finnagle's Laws as requested by you in your Brass Tacks Column.

1. Do Not Believe In Miracles—Rely On Them.
2. Experiments Must Be Reproducible—They Should Fail The Same Way.
3. Always Verify Your Witchcraft.
4. First Draw Your Curves—Then Plot Your Readings.
5. Be Sure To Obtain Meteorological Information Before Leaving On Vacation.
6. A Record Of Data Is Useful—It Indicates That You've Been Working.
7. Experience Is Directly Proportional To Equipment Ruined.
8. To Study A Subject Best—Understand It Thoroughly Before You Start.
9. In Case Of Doubt—Make It Sound Convincing.

There are only nine laws since the tenth was Finnagled away.—Jon H. Myer, 7507 Arizona, Los Angeles 45, California.

*The Tenth was not Finnagled away—but it is the never-to-be-expressly-stated rule about always leaving room to add an explanation if it doesn't work—the rule of The Way Out.*

THE END

(*Continued from page 9*)

ly. My retinal after-image had bounced across a field of grass, bouncing twice, then bounced off a barn, and finally, some eight to ten seconds after the initiating flash, struck and shattered an eight-inch oak tree. That was really quite a potent retinal after-image; the trunk of the tree was shattered like a broken Manila rope. And I do, of course, feel I am a "competent observer."

Currently ball-lightning is accepted. At that time, it was known that no structure of electrostatic fields could be stable; therefore ball-lightning was known to be impossible, and had to be faulty observation. Currently, physicists are studying what are called plasmoids as a possible approach to controlled fusion power. They might have gotten started several decades earlier if they'd not been quite so certain that ball-lightning couldn't happen. Ball-lightning is simply scaled-up plasmoid phenomena; physicists in laboratories don't have the 50,000,000 volt, 5,000,000 ampere discharges to work with, so they have to work in nearly perfect vacuum conditions, with near-microscopic plasmoids. The one I saw was roughly ten inches in diameter. Plasmoids have the interesting characteristic of bouncing off of each other, and being quite self-protective and self-sustaining. It's still true that electrostatic structures aren't stable . . . it's just that the boys forgot to consider the effects of powerful magnetic fields generated by spinning electric charges.

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There are a number of perfectly standard reactions any orthodoxy will display when challenged by an innovator. Be it remembered, the orthodoxists are *not* insincere, dishonest, acting out of economic vested interest, or seeking to suppress something they know perfectly well is really true. The problem is that sincere, honest men can be just as wrong in their opinions as any crook. And because they are patently sincere, honest men, they get a far stronger backing than would a dishonest or crooked individual. They are men to be respected, and trusted—and their word is believed. The men who attacked Galileo were not shallow, stupid, dishonest or insincere men—but they were still wrong. When a very deep, and very powerful emotional force acts on a man, he is not aware that he is being driven by any force other than rational and logical knowledge; the doctors who hounded Semmelweiss acted in the sincere belief that their reactions were solely rational, not influenced by nonlogical factors.

In the following discussion, assume that the Innovator is facing opposition from sincere, honest men, who genuinely and conscientiously believe it necessary to stop the Innovator because he is clearly a fraud, a clever trickster, who has some illusion that is mulcting untrained and gullible people. That it is their social duty to stop the nonsense he is purveying.

The doctors tried hard to stop Pasteur, with his impossible nonsense. He was a menace to the health of human beings, with his zaney ideas about "germs."

Typically, the observational evidence the Innovator seeks to present will, first, be presented to "untrained, incompetent observers." To "laymen not competent to analyze the matter." Typically, the orthodox authorities will not accept any challenge to investigate the matter; the reports of laymen observers have been studied, of course, and it's evident that this trickster has some very ingenious illusion that may be extremely difficult to spot. In that case, if the trained observers do observe, and cannot explain the phenomenon away, the charlatan will start claiming that trained observers were forced to agree that his nonsense did work.

When a police force knows perfectly well that a certain individual is guilty of the crime, they have an understandable tendency to make the evidence prove what they know, whether it does or not. Courts exist partly to restrain that human tendency.

Orthodoxists, knowing perfectly well that the Innovator is a fraud, will seek equally to make the evidence prove it.

Reliability is the usual point of attack. No device known to science works with absolute, one hundred per cent reliability. If you think that's a false statement, ask a safety engineer if there is any absolutely certain fail-safe device.

But when the Innovator presents his device, if it fails once in a thousand times there is gladsome shout-

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ing that it didn't work under laboratory test. See! We knew it was a phony! He was a clever fraud, but we trapped him in the end!

When a known, understood and accepted system fails, or behaves with inexplicable erratic performance, that's just because we don't yet know all the phenomena involved.

When the Innovator's device fails once—that proves it is a fraud.

One French doctor, unshakably convinced that Pasteur was a blatant fraud, deliberately and publicly swallowed a quantity of what Pasteur claimed was a "deadly culture of cholera germs." For reason or reasons now unknown to Man, the doctor didn't get cholera—and loudly proclaimed that that proved Pasteur was a fraud.

What standards of reliability should be demanded of a newly discovered phenomenon? Perfect, unbroken repeatability? Anybody in the audience here ever tried debugging a newly designed piece of perfectly standard, old-line, orthodox design? What standards of bug-freeness should be expected of a device based on new concepts of design?

Another standard attack method, is to seek to prove that the phenomenon doesn't exist. If a man claims he can transmute copper to gold, the orthodoxists will try to establish that it wasn't really copper to start with—that the chemical tests used to prove it was copper aren't reliable.

An example of this type of technique—it's an illegitimate form of argument, *per se,* whether the case under discussion is valid or not—showed up in the case of Medical Science vs. Harry M. Hoxsey's cancer treatment. In the trial held in Dallas, where Hoxsey was suing Morris Fishbein, editor of the AMA Journal, for libel for calling Hoxsey a "charlatan," "cancer quack," and assorted other opprobrious epithets, the witnesses for Medicine sought to prove that Hoxsey hadn't cured cancer because no cancer had existed.

The case Hoxsey presented had been diagnosed as cancer by professional pathologists, recognized as competent and licensed by the AMA. The diagnosis had been made by X-ray examination, by tissue biopsies, and other standard diagnostic procedures. The orthodoxists attacked

Hoxsey's evidence on the basis that biopsy diagnosis is unreliable, since pathologists sometimes mis-diagnose the specimens. That X-ray diagnosis is subject to misinterpretation. That laboratory specimens sometimes get mislabeled in handling—babies get mislabeled and given to the wrong mothers, too—and therefore the diagnostic procedures can't be relied on. No cancer proven.*

The diagnostic tests used were, however, the standard tests on which medical science itself relies. The argument is, then: "The tests are reliable when we orthodoxists use them, but are known to be unreliable, and since we know this Innovator must be a fraud, it's clear that the tests didn't work properly when he used them."

Incidentally, those same diagnostic tests don't work when used by the doctors at Lourdes, either.

Another standard attack of the orthodoxists is the "coincidence" explanation. That is, "If it did happen, it was pure accident. The Innovator had nothing to do with it." In the Hoxsey case, for instance, where cancer was a little hard to deny, the explanation of spontaneous remission was proposed. A minute percentage of cancer cases do undergo spontaneous remission; therefore this could explain undeniable cancer cases.

Be it noted at this point: I am *NOT* proposing to argue or discuss whether or not Hoxsey can or cannot cure cancer. That's not the topic I'm interested in. I refuse to enter the already hot argument on that subject.

I want to use the fact *that that argument exists,* and simply *look at the techniques being used against Hoxsey.* Assume if you wish that Hoxsey is wrong; I don't care one way or the other. *Is the argumentative technique being used against him a legitimate method of argument?* Rigged evidence is illegitimate, whether the man it's used against is or is not guilty of the crime charged.

I hold that *the method of argument being used* against Hoxsey is typical of the methods of argument used against Innovators generally. Whenever men feel, sincerely, honestly, and mistakenly or not that an Innovator is a subtle fraud, method of fraud too clever to be specified, they will seek to prove the fraud they just *know* must be there, by the use of illegitimate, but effective, techniques.

The denial of evidence given by "untrained observers, laymen unable to evaluate, et cetera" method is, of course, present in the Hoxsey case, too. Laymen aren't competent to say, "I was sick, I was told I had cancer by my doctor; Hoxsey treated me and now I feel fine." Not only is a layman incompetent to diagnose cancer, he is also incompetent to say what he paid his doctor to treat him for. Therefore evidence of such incompetents is not to be admitted in consideration.

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***Incidentally, Hoxsey won the case. Fishbein, the Hearst newspaper that published Fishbein's article, *et al.*, were found guilty of libel. The case was, in essence, tried twice; Hoxsey won both times.**

(There's a curious legal twist here. If you go to a surgeon to have an operation on your right ear, and he instead operates on your left ear, you can sue him for malpractice, even though it was his professional judgment that the left, not the right ear, should be operated on. But if you go to a doctor and ask him to treat you for medical condition A, he can use his professional discretion to treat you for B. I don't understand just how that reasoning works, but that's the law.)

Finally, the most powerful weapon of orthodoxy is simply "You can't fight City Hall." Try it in the literal sense, and you'll have fire inspectors discovering fire violations. The Shade Tree Commission will find your trees need expensive work. Road repairs in front of your place of business somehow don't go right, and take several months. A mix-up in your tax records requires hiring a lawyer for several months. The obnoxious individual can be harassed by irrelevant matters to the point that it isn't worth the fight.

It is then used as proof that the idea he was fighting for was no good. "Well . . . he quit talking about it himself, didn't he? Proves there wasn't much to it, don't it?" Galileo quit talking about it himself, didn't he?

In modern times, an effective technique for making the Innovator shut up is to embalm him in a glue of meaningless annoyances and complexities. You'd be surprised how many different kinds of licenses you *can* be required to take out. Have any rubber cement around your office? Many cities require a license for storing inflammables; you could be made to take out a license for that little can of glue. Have a water cooler in your place? Got a refrigeration license for it? Got a pack of cigarettes? Did you break the tax stamp when you opened it? That's a Federal offense if you didn't. Still want to fight City Hall, eh?

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The technical experts explain, carefully, that he's being suckered by a hoax—and the business man drops the deal.

See . . . that proves the idea's no good! Nobody will touch it!

And the oldest of all attacks on the Innovator's idea is still with us—the attack of "All authorities agree that this is of no value," or, alternatively, "No authority has ever found any value in this idea."

Think that's not being used any more—that Galileo's fight against Authority as a source of answers settled that point?

The Federal Drug Administration has put posters warning people against trying Hoxsey's cancer treatment in post offices all over, inviting inquiries for more information. If you write in, the FDA's pamphlet against Hoxsey's treatment states authoritatively that "a search of the medical literature shows no evidence of therapeutic value" in the herbal remedies Hoxsey claims are his original discovery.

Someone should tell the FDA that if they *did* find evidence of previous knowledge of therapeutic value in those substances, *that would disprove* Hoxsey's claim that it was an original discovery. That they do *not* find anything in the medical literature simply proves that Hoxsey's claim to an original discovery might be right.

Orthodoxists always have, and of necessity always will, consider "But that's not what it says in the books!" as a valid argument against an idea.

Necessarily, it isn't in the books if it *is* an original, new idea.

There's a type of straight-A student in schools who has nearly perfect memory, and can quote the text almost word for word—and who screams in high outrage at the injustice of it all when the question asked "isn't in the books!" You simply can't remember the answer to a question that demands creative understanding, instead of encyclopedic knowledge.

Further, the answers that stem from creative understanding can't be checked by looking them up in the books. If they can, they aren't original.

How, then, can you "demonstrate" the validity of something that isn't in the books, doesn't derive from anything in the books, and contradicts a dearly held conviction?

One of the greatest of all philosophical problems remains unanswered—and, actually, almost unattempted!

*Define the meaning of "to demonstrate"!*

THE EDITOR.

THE END

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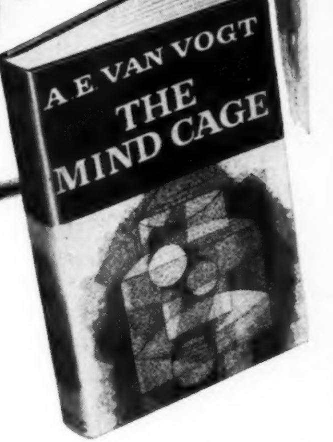

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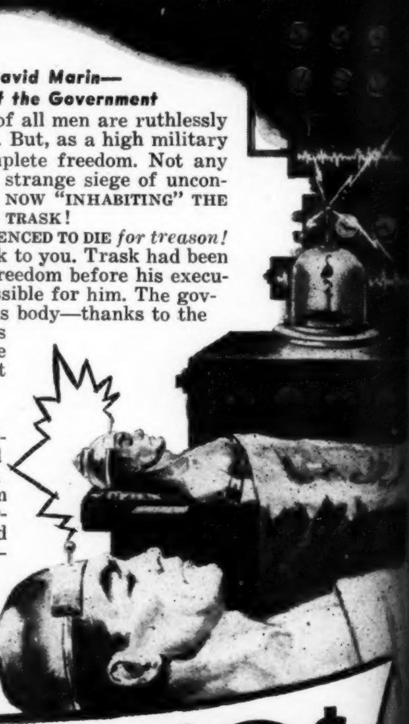

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